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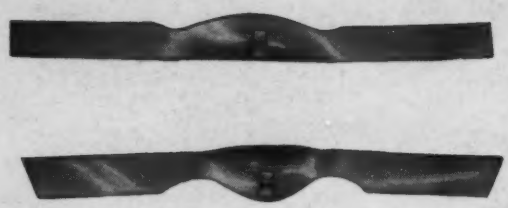

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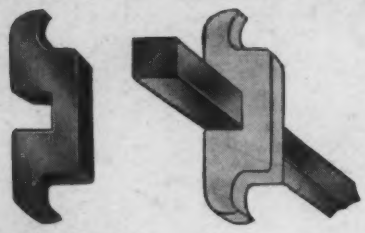

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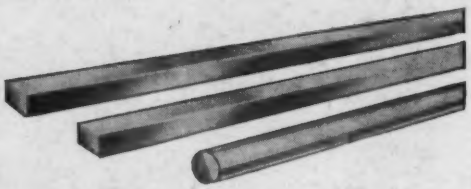

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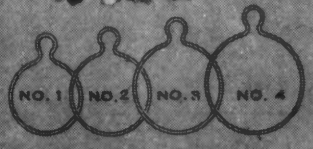

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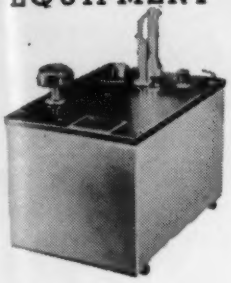

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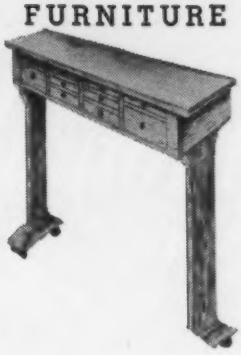

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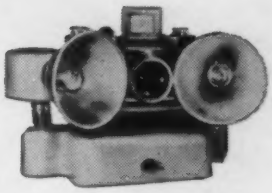

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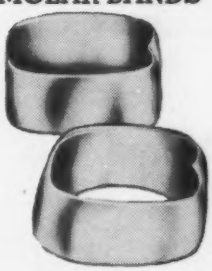

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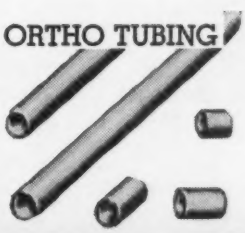

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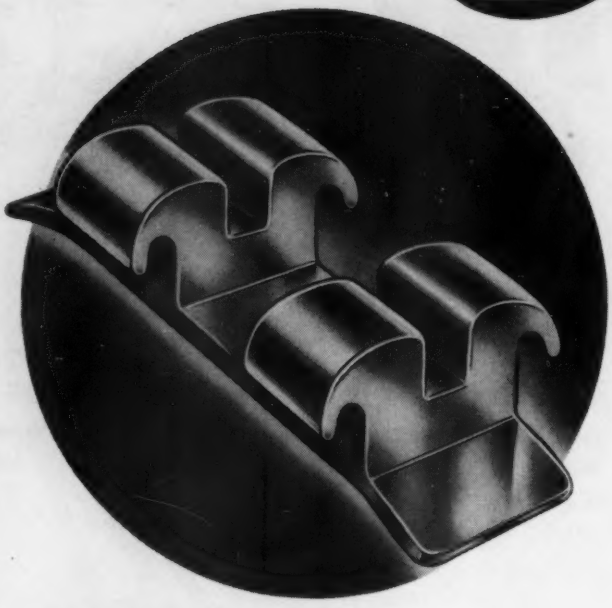

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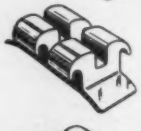

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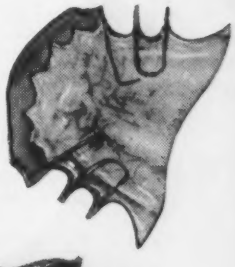

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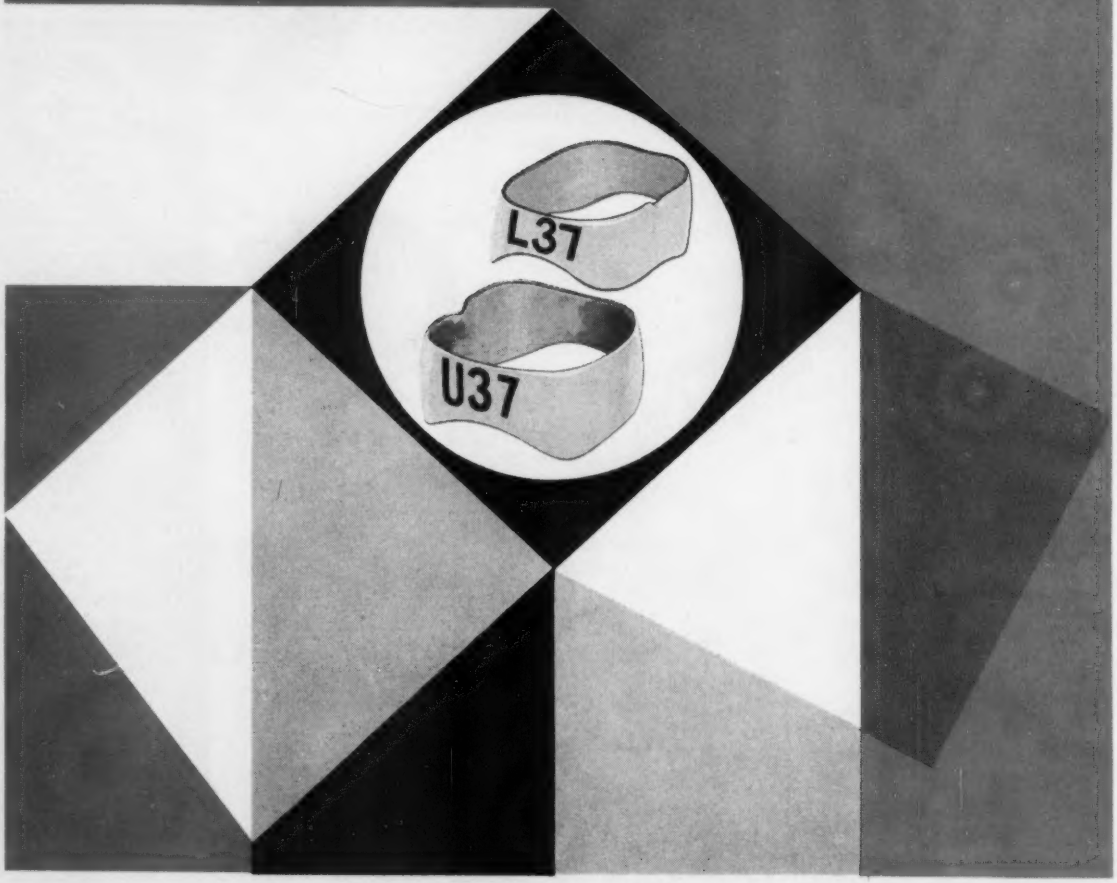

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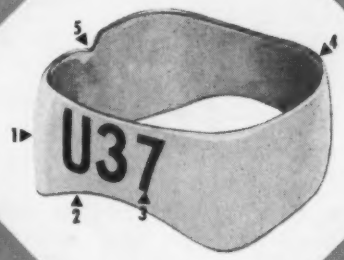

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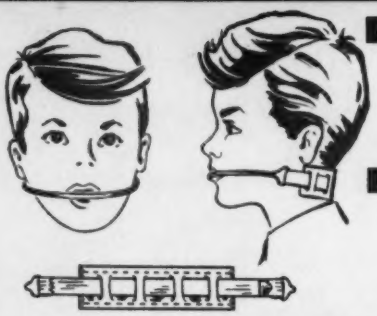

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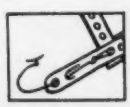

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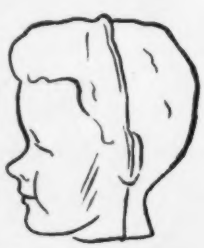

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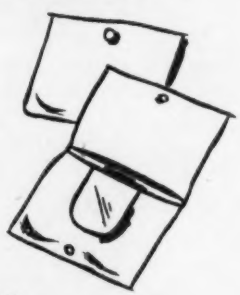

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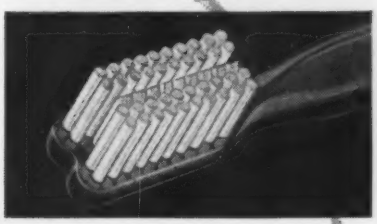

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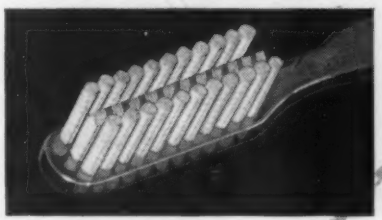

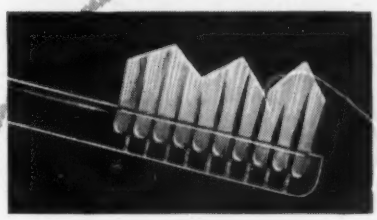

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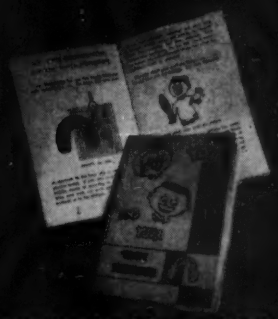

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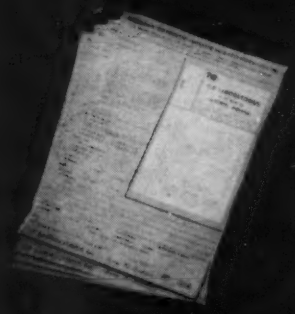

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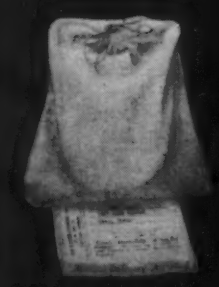

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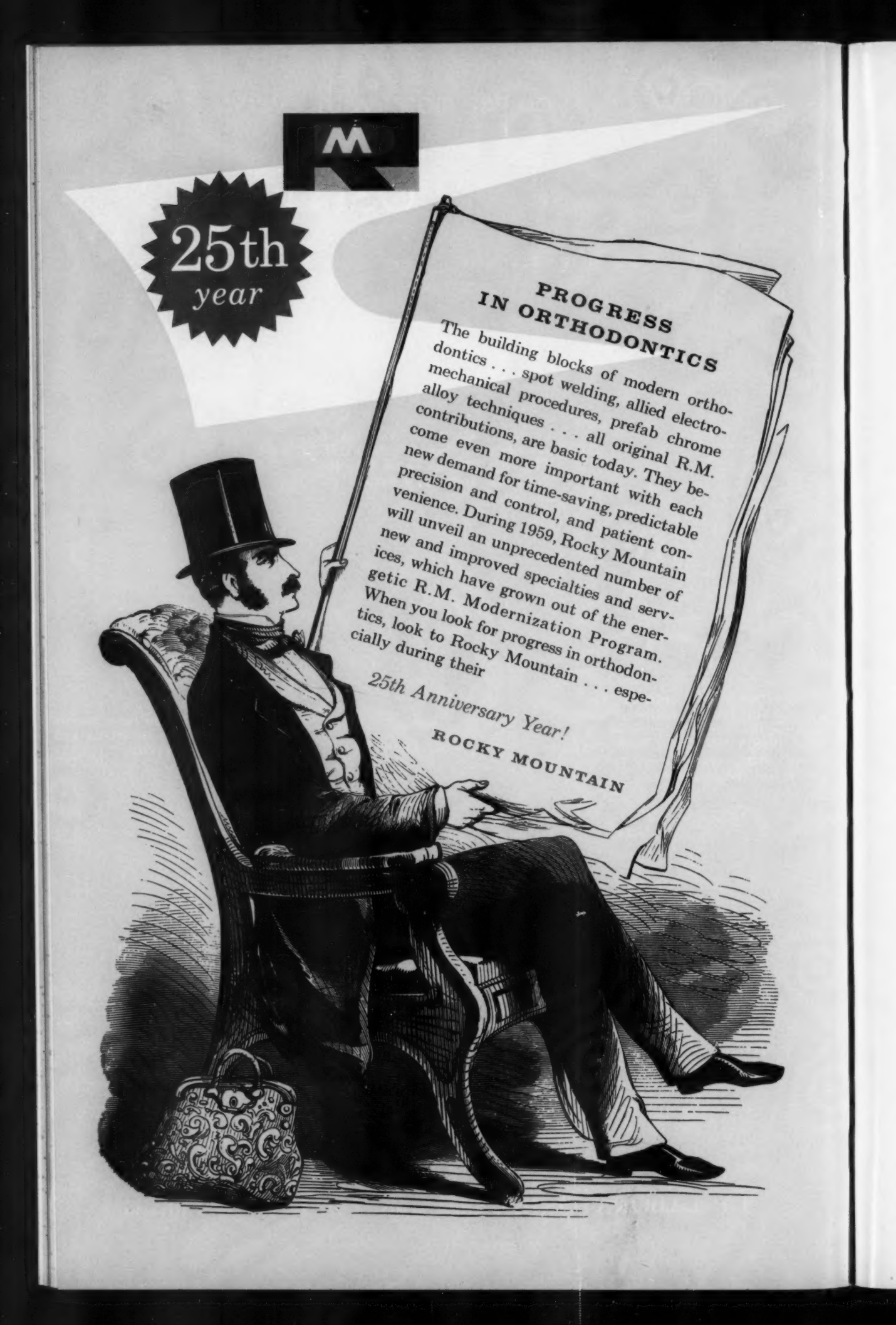
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American Journal

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ORTHODONTICS

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Original Articles

PRESIDENT'S ADDRESS AMERICAN ASSOCIATION OF ORTHODONTISTS

A. C. BROUSSARD, D.D.S., NEW ORLEANS, LA.

IN PRESENTING the President's Address, as prescribed by the bylaws, I will attempt to inform you of some of the important happenings during my administration, as I see them, and use my presidential prerogative of offering suggestions and recommendations which I deem worthy of your consideration.

PROGRAM COMMITTEE

I feel that you will all agree that our Program Committee, namely, Drs. George Anderson (chairman), Paul Hoffman, William Brandhorst, Arnold Stoller, and Hal Terry, has produced an outstanding program.

The subjects were selected with a "flow for the program," as George Anderson termed it two years ago. I know that at the close of the meeting you will agree, since the program is the essence of the meeting, that theirs is a job well done. The long and wearisome months spent in preparation of the program are reflected in the fine material and the men selected who could do full justice to their assignments.

Judging by the number of advance room reservations, our attendance will surpass the last five meetings. We local boys are proud and flattered and attribute this huge attendance to a superb program.

Presented before the American Association of Orthodontists, New Orleans, Louisiana, May 13, 1957.

On behalf of the American Association of Orthodontists and our local committees, I want to sincerely welcome all members, guests, and those from other countries.

In 1921 I was a guest at the meeting of the American Society of Orthodontists in Atlantic City. At that time, the Society, which is now the American Association of Orthodontists, had a membership of 182. Dr. J. Lowe Young was President.

At our Boston meeting last year our membership was 1,566 active members, and since then 171 members have been accepted. This is only eleven less taken in during this last year than during the first twenty-one years of our existence.

Our membership today includes 1,710 active members and a total of 1,782, including honorary, affiliated, service, and retired members, showing a slow but steady progress, and our financial position is stable, as will be shown by our treasurer's report.

ROENTGENOGRAPHIC CEPHALOMETRIC WORKSHOP

Last year President Adams appointed a special committee to study the feasibility of holding a Cephalometric Workshop. The committee—Drs. J. A. Salzmann (chairman), Allan Brodie, L. Bodine Higley, and W. M. Krogman (as Consultant)—presented a plan at our Boston meeting to hold a Workshop on Cephalometrics. The report was accepted, and the Workshop became a reality on March 24, 25, and 26, 1957, at Western Reserve University in Cleveland, Ohio, where our esteemed member, Dr. B. Holly Broadbent, pioneered in the cephalometric field. His findings are accepted as standard today. The purpose of the Workshop was to standardize technique, clarify interpretation, evaluate clinical application, and recommend certain minimum procedures to follow.

A 371-page *Syllabus* was prepared in advance by Drs. Krogman and Sassouni of the Philadelphia Center for Research in Child Growth. The *Syllabus,* containing all available data on cephalometrics, was mailed to all participating members of the Workshop prior to the meeting in order that they might study it to be prepared for any discussion. The Committee, under the able leadership of Jack Salzmann, outlined subjects on cephalometrics, and members of the Workshop came to the meeting with papers prepared on the subjects assigned them.

Those present were Drs. J. A. Salzmann (chairman), L. B. Higley, Allan Brodie, and W. M. Krogman of the Committee, participants B. Holly Broadbent, T. M. Graber, Herbert I. Margolis, and Robert E. Moyers, and, from the Faculty of the School of Medicine of Western Reserve University, Dr. C. Wesley Dupertuis, Clinical Anthropology, Dr. Norman Hoerr, Department of Anatomy, and Mr. William H. Golden, Department of Anatomy.

It was my pleasure to attend the three-day meeting, and I feel that the Committee has fulfilled the purpose of the Workshop. During the entire

meeting the discussions were rather pointed. The real problem was to separate the research aspect from the clinical, which was actually the basic purpose of the Workshop.

On the third day democracy at its best prevailed and, by vote, minimum points, lines or planes, and angles were agreed upon. The acceptance of the minimum for clinicians will in no way limit those who wish to use more points, planes, or angles toward research possibilities.

While it was generally agreed that it is impossible to standardize one method or technique, the minimum suggested should prove ample for the clinician to evaluate his findings and later check on his results.

I feel that our Association is indebted to the participants, particularly chairman Jack Salzmann and his Committee and Dr. W. M. Krogman for the advance preparation for the successful meeting, and to Dr. B. Holly Broadbent who made all arrangements for our rooms and meeting facilities at Western Reserve. A cephalometric atmosphere prevailed, and Broadbent was a perfect host.

The *Syllabus* should be a must for all orthodontists and those closely allied with orthodontics. The *Syllabus* is available through the Philadelphia Center for Research in Child Growth.

While the full report of the Committee will not be ready for this meeting, the ground work is complete. The Committee will prepare a brochure of its findings, which will be made available to the membership. It was generally agreed, however, that the value of cephalometric procedures lies not in the mechanical aspects but in the individual evaluating his findings.

ADMISSIONS COMMITTEE

This Committee was created at the last meeting and is composed of the directors representing the constituent societies. It was my privilege to appoint Dr. Edgar Baker as Chairman.

The purpose of this Committee is to establish uniform rules under which the Admissions Committee of the constituent societies will operate.

There is more importance attached to this Committee than one may suspect, and it is doubtful that the Committee will offer a complete report at this meeting. The Committee has received suggestions this past year and will be happy to consider any other suggestions that our members can furnish. The Committee's work during the past year was by correspondence, and a meeting of the Committee was held on Saturday for proper discussion of the merits of the material collected.

I strongly recommend that the Committee continue its effort to solve problems of admission to the constituent societies.

ORTHODONTIC GRADUATE AND POSTGRADUATE PROGRAMS

Our Education Committee was instructed to make a survey of the curricula of the graduate and postgraduate orthodontic training programs for the purpose of standardizing a curriculum. A questionnaire was sent to all

schools, but the report of the Committee is one of progress and, more time will be required before the results of the survey can be evaluated. The Committee should continue its efforts to a conclusion.

The present-day dental educational program has made more progress within the last twenty years than in the previous eighty years. No doubt this is due to the minimum course of study for the D.D.S. or D.M.D. degree required by the Council on Dental Education of the American Dental Association. Regardless of the school one attends, he is assured of the accepted minimum requirements. If a minimum curriculum has done so well in dental education, we must assume that it can do as much for graduate and postgraduate orthodontic training.

Since the beginning of graduate and postgraduate orthodontic training about thirty years ago, no serious effort has been made to determine a minimum course that will help one to become proficient in certain elements of orthodontic practice. There has been much discussion and criticism of the programs offered, but I believe we can agree that there are excellent courses now being offered. It is apparent, however, that most of these are designed on an individual basis rather than on an agreed and common program. The American Association of Orthodontists has no authority to inspect and evaluate graduate or postgraduate orthodontic courses, but at its Boston meeting the Association accepted the recommendation of its Education Committee to study such orthodontic programs and offer its help to the Council on Dental Education of the American Dental Association for the purpose of standardizing the 1,500-hour programs.

The Cephalometric Workshop, to my mind, as mentioned above, was a complete success and the participants with various ideas came to an agreement on minimum procedures to follow. The same method could be used for standardizing graduate and postgraduate programs in orthodontic training if all the directors would hold a workshop with a common purpose in mind—a minimum course in orthodontic training.

I am aware of the financial problems involved in such a venture. This Association obviously would not be able to finance such a workshop, but I do believe that the schools would be willing to bear the expenses of attendance for their directors as they do for their representatives at meetings of the American Association of Dental Schools. I do not mean to imply that, if such a workshop is held and a minimum course agreed upon, there should be an annual meeting of the same type with the costs involved to be borne by the schools. Should there be need for further meetings, these could be held at the time of this Association's annual meeting.

I recommend that our Education Committee, with the sanction and cooperation of the Council on Dental Education of the American Dental Association, plan a workshop during the year, with all the directors of graduate and postgraduate orthodontic programs as participants, for the purpose of establishing minimum requirements of graduate and postgraduate orthodontic training programs, and that our Committee report its progress to this Association and to the Council on Dental Education of the American Dental Association.

LADIES' AUXILIARY

The Special Committee for the Ladies' Auxiliary made a preliminary report last year. After a two-year study, the results of which will be presented at this meeting, it was concluded and recommended that such an organization should not be formed at this time.

FEDERAL TRADE COMMISSION

At the Boston session of the American Association of Orthodontists the Public Relations Committee and the incoming officers were instructed to cooperate with the American Dental Association with regard to the Federal Trade Commission's "Trade Practice Rules for the Commercial Dental Laboratory Industry." The American Dental Association was informed of our desire to cooperate.

Since some of the features were objectionable, the American Dental Association requested from the Federal Trade Commission a hearing for the revocation of the Trade Rules, which was denied. Also denied was the request for enlarging the scope of the hearing. The Federal Trade Commission, however, agreed to allow the American Dental Association to present its case on the terminology, as found in the Rules, with respect to "design" and "occlusion."

This hearing on "design" and "occlusion" was held in Chicago on Feb. 4, 1957, at which time the American Dental Association with the cooperation of the National Association of Dental Laboratories presented its case.

At the request of the American Dental Association, our esteemed member, Dr. John R. Thompson, was appointed by your president, with the approval of the Ad Interim Committee, to present our present-day conception and application of occlusion in its fullest meaning, which includes anatomy, physiology, growth and aging process of the teeth, supporting tissues, the facial structures, joints, and musculature. Dr. Thompson's paper was well written, and his presentation was a credit to our Association. Dr. Fred Aldrich, chairman of our Public Relations Committee, who has had experience with the Federal Trade Commission, served us as consultant.

From the information received to date, the Federal Trade Commission's answer to the American Dental Association's request for deletion of the words "design" and "occlusion" will probably be received by the American Dental Association the latter part of this month.

The mentioning of the Federal Trade Commission has been of deep concern to some of our members to which I do not subscribe. Too many of us forget that we are dentists, that the American Dental Association is our parent body, and that orthodontics is not an unrelated profession. We must be members of the American Dental Association to be eligible to become members of this Association. The American Dental Association, with all its facilities, certainly is better equipped to protect its members. The American Association of Orthodontists should, then, be ready at all times to cooperate with the American Dental Association.

Since we are dentists but by choice practice orthodontics, we must maintain good orthodontist-dentist relations, which can be accomplished in many ways.

Last year some of our orthodontic meetings were held at the same time as the American Dental Association meeting. The orthodontist should attend dental meetings, respect the general practitioners, and cooperate in every way possible. This will help us to avoid criticisms.

I assure you that these remarks are not antagonistic. Remember that remarks and criticisms reach your president, and your president and the Board are better able to judge their significance. Let us create good dental and public relations for the honor of our profession and ultimate service to the public.

Dr. Fred Aldrich, chairman of the Public Relations Committee, has submitted his report to the Board of Directors, including Dr. John Thompson's full statement to the Federal Trade Commission.

PATIENT TRANSFERRAL

Last year Dr. Scott Holmes, chairman of a Special Committee on Patient Transferral, presented his report and it was published in our JOURNAL in June, 1956. The report has had so many favorable comments that I urge you to read it again and have it for future reference.

Besides the Cleveland Cephalometric Workshop, I had the pleasure of visiting the Southern, Southwestern, and Mid-Atlantic Societies, and I regret that I could not accept the invitation of the Pacific Coast Society. I was very pleased to see the enthusiasm and to participate in such interesting meetings.

I want to congratulate them for their contribution to orthodontics and to our Association's welfare.

The progress of our constituent societies is found in the reports of the directors representing their respective societies.

CONVENTION PLANNING COMMITTEE

Our Association at present cannot be considered a small organization, and not all hotels can accommodate our needs for the type of meeting that we have been having. Most of the larger organizations have adopted five-year plans, and to be assured of proper hotel accommodations for all our members I believe that it is time for us to consider a five-year plan which I recommend.

The selection of a city five years in advance does not and should not necessarily mean that the Nominating Committee or the members should select the president from that city, as there are too many men in smaller cities who are just as qualified and deserving of the honor.

INTERNATIONAL RELATIONS

I believe that the time has come for some efforts on our part to be made for some mutual understanding of our orthodontic problems with those of

Europe and the Far East, even though our socioeconomic conditions are very different. I am not an authority on foreign conditions, but my contact with some of our members who visited foreign countries has given me some ideas of conditions abroad.

I offer the following ideas not as recommendations but as suggestions for consideration by the Board of Directors:

The International Congress meets in New York in September, 1959, at the time of the American Dental Association's Centennial meeting. It would be a wonderful opportunity for our Association to sponsor a program for the benefit of our foreign visitors. This program could be held prior to or during the International Congress. Since our Association meets in Detroit in May, 1959, possibly some arrangement could be made with the International Dental Congress or the American Dental Association for some of our Detroit essayists to appear before our foreign visitors. It would be on the border of a repeat program, but it would be new to our visitors if the publication of the material was delayed until after the New York meeting.

A number of our capable members attend the Fédération Dentaire Internationale and the International Dental Congress whose meetings are held abroad. This would be another opportunity of presenting a program with foreign members interested in orthodontics.

A copy of the official program of our annual meeting and programs of our constituent societies could be sent to foreign orthodontic societies.

Invitations could be sent to each society to attend our meetings, and they could be guests at some of our functions. They would pay their own expenses.

I took the privilege of appointing three of our prominent members to represent our Association at the European Orthodontic Society and the Japan Orthodontic Society. It was a good-will gesture for these men to appear on their programs and no doubt helped to cope with our mutual problems in orthodontics.

A long-range program which cannot materialize at present but could be something to look forward to would be the granting of a European and foreign tuition scholarship to a deserving graduate student for graduate study at an American university.

The above suggestions, if applied, would show our foreign friends our willingness for mutual understanding.

It is impossible for me to report in detail the activities of all the twelve elected committees, but I can assure you that they have given their time and efforts to their assignments for your interest and the interest of the Association.

Their reports will be submitted, and their recommendations with comments from the Board of Directors will be presented to you at the business session.

PUBLICATION

I am happy that our Publications Board under Dr. Leigh Fairbank, chairman, completed a very satisfactory contract with The C. V. Mosby Company, our publishers, whereby both are mutually benefited.

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists, the constituent societies, and the American Board of Orthodontics.

We will continue to furnish editors, editorial staffs, and articles for the JOURNAL, which is still our principal ambition.

There has been an increase in the cost of publication. This has been borne by the publishers and compensated somewhat by the increase of our membership.

My congratulations to Dr. Leigh Fairbank for his interest and untiring efforts on our behalf.

RESEARCH COMMITTEE

The Research Committee, headed by Dr. Alton Moore, has worked hard and I believe that it is fully rewarded by the number and type of abstracts submitted to the Committee. Of the thirty-two who submitted abstracts, seventeen requested time to present their subjects.

The Research Section has grown annually in the last few years to the point where the time allotted it is very inadequate.

ELIGIBILITY REQUIREMENTS

At the San Francisco meeting in 1955 the 1,500-hour eligibility requirements were adopted, to take effect two years hence, that is, at the close of this meeting.

At the same meeting, a committee was appointed to study further the eligibility requirements for admission to membership in the American Association of Orthodontists. After a year of careful study, at the 1956 Boston meeting the Committee presented new amendments with a preceptorship clause. This will be acted upon at the business session of this meeting.

The adoption of these amendments will automatically supplant those adopted in San Francisco in 1955.

It is not wise for a president to advise or voice his opinion. I will say, however, that I consider the amendments a very serious part of our meeting and your voting will determine the status of our great Association.

You have received these amendments in our secretary's letter to all the members sixty days ago. Please give very serious thought to these amendments, remembering what our Association has been in the past, and attempt to visualize the effects of your vote in the future. Vote with an open mind and without prejudice.

BUSINESS MEETING

There is a directive in our bylaws, Chapter VII, part of Section 3, which reads:

> **The committee (nominating) shall present such nominations at the business meeting of the annual session immediately following the scientific program on the *afternoon* of the second day.**

At the 1955 meeting in San Francisco the afternoon of the second day was devoted to recreation, which is a good feature, and in Boston in 1956 the afternoon was devoted to the Research Section. Both interfere with the attendance when the business session is held on the afternoon of the second day.

I therefore recommend that the bylaws be amended to read: ". . . immediately following the scientific program on the *morning* of the second day."

The selection of a new chairman by the elected committees has always been a problem, and I suggest that the outgoing chairmen direct their respective committees with respect to the need of electing a new chairman. This should be done before the annual meeting is over.

According to the bylaws, if a committee fails to elect its chairman during the annual session or if the chairman neglects to notify the secretary of the election of a chairman within thirty days after the close of the annual session, the president shall appoint a chairman for the ensuing year.

This is not only an added duty for the president and secretary; it seriously delays the completion of the committees and the printing of the stationery.

It is very apparent that the duties of the president and (more so) the secretary-treasurer are increasing yearly, and I suggest that "full cooperation" be the motto, not only from the members but from the officers of the constituent societies, which will greatly relieve the officers of this Association of unnecessary duties.

AMERICAN BOARD OF ORTHODONTICS

On behalf of the Association, I wish to extend my thanks to the American Board of Orthodontics for its sincere and unselfish efforts and dedication of time to the elevation of the standards of orthodontics.

My congratulations and best wishes to Dr. Oren Oliver, who will receive the 1957 Albert H. Ketcham Memorial Award Tuesday at noon.

I want to thank Vice-President Stevenson, President-Elect Squires, Secretary-Treasurer Shepard, and Chairman of the Budget Committee and Ad Interim Committee member George Siersma for their fine cooperation.

I owe thanks to our editor, Dr. H. C. Pollock, for his willingness at all times to consider JOURNAL matters. He makes us know that it is really our JOURNAL.

You probably have noticed that the three places and dates of our future meetings are found on the officers' page. I have offered the suggestion that the director representing a constituent society should be listed as an officer with the constituent society officers and the places and dates of the meetings of the societies could occupy another line below the respective officers.

I am sure that our editor will be pleased to follow through if the secretaries will send to the secretary of the American Association of Orthodontists the above information.

SECRETARY-TREASURER EARL SHEPARD

Our secretary-treasurer, Dr. Earl Shepard, has completed his first year in that office, and, even though he is a new man in office, I cannot praise him too much for his prompt and efficient manner in handling his duties. His cooperation is sincerely appreciated by your president.

We have had with us for a number of years our superefficient Mrs. Augusta Grimm, who probably knows more about our affairs than the officers. It is a pleasure not only to work with her but to know her—lawyer, reporter, parliamentarian, and I might add sergeant-at-arms to the Board of Directors.

I want to take this opportunity to thank all the essayists and clinicians for the many hours spent in preparation of their subjects to make this meeting a success.

I offer my sincerest appreciation on behalf of the Association to our exhibitors for their part in our meeting.

And to Dr. S. D. Gore, chairman, the Local Arrangements Committee, and the local committees, for their loyalty, efforts, and coordinated spirit in the operation of the meeting, I am forever grateful. To all of these go my deepest appreciation and most grateful thanks.

For the honor of serving the Association, inadequate though the words may be, there are no substitutes for words that express my sincere and heartfelt "thank you."

ORTHODONTIC RELAPSES ANALYZED IN A STUDY OF CONNECTIVE TISSUE FIBERS

H. E. Thompson, D.D.S., M.S.D., Kansas City, Mo.

MOST members of the dental profession profess to know little about the science of straightening teeth. On the other hand, the family dentist feels that there is little that we, as orthodontists, cannot do in the placement of teeth into new positions. Even more astounding to most of the men in general dentistry is the fact that sometimes these teeth do not stay in these new positions. Men who are new in orthodontics and who have seen teeth moved spectacular distances are prone to believe that it is simply a matter of using the right technique to acquire the ideal result. They think that once the orthodontist is thoroughly trained in a certain technique and his office doors are opened, every malocclusion patient who enters is potentially the beauty queen or handsome Harry of tomorrow.

After a few years, when some of the very tough cases are completed with results that would make any orthodontist proud, records are made to take to the next orthodontic meeting. This is proof enough of the established ability of a perfected orthodontist. Mention is not made of the fact that a few of those tough cases started at about the same time did not turn out quite that well, the reason being, of course, that the patient did not cooperate. There is also failure to mention that the records shown were made while the patient was still wearing retainers; a close look at the finished impressions will often reveal the posterior border of the upper Hawley retainer.

Once finished records were made and the orthodontist had evidence that this was a well-treated case, the patient was instructed that he need now wear his retainers at night only. Upon the orthodontist's return from this orthodontic meeting, the next visit of the patient was a little disheartening because one of those lower incisors was beginning to rotate a little. Re-examination of the original model reveals that it was the very tooth that was rotated in the beginning. A few months elapse, when notice is made of the fact that the upper lateral incisor that was lingual to the line of the arch prior to treatment is beginning to creep back just a little. The patient insists that he has worn his retainers faithfully, but the orthodontist knows better. Well, those teeth are not set yet, so it is decided that the retainers should be worn for a while longer, even though the time when the patient was told that he could *probably* stop wearing them is past. Some time passes before the

Read before the Central Section of the American Association of Orthodontists, Cedar Rapids, Iowa, September, 1958.

patient is seen again, and when he explains with a guilty look that he forgot to take the retainers to camp with him and that when he got back home they would not go in, well, that is positively the end of the trail! The puzzled orthodontist stands back and looks at this beautifully treated case in amazement. How could this possibly happen? He did everything, and I do mean *everything*, right in his course of treatment. He did set up anchorage. He got those teeth tipped back—way, way back. He did get the teeth over basal bone. He did not expand the arch form. He got good muscle balance in the case. The profile of the patient was much improved. *It just had to be poor patient cooperation!*

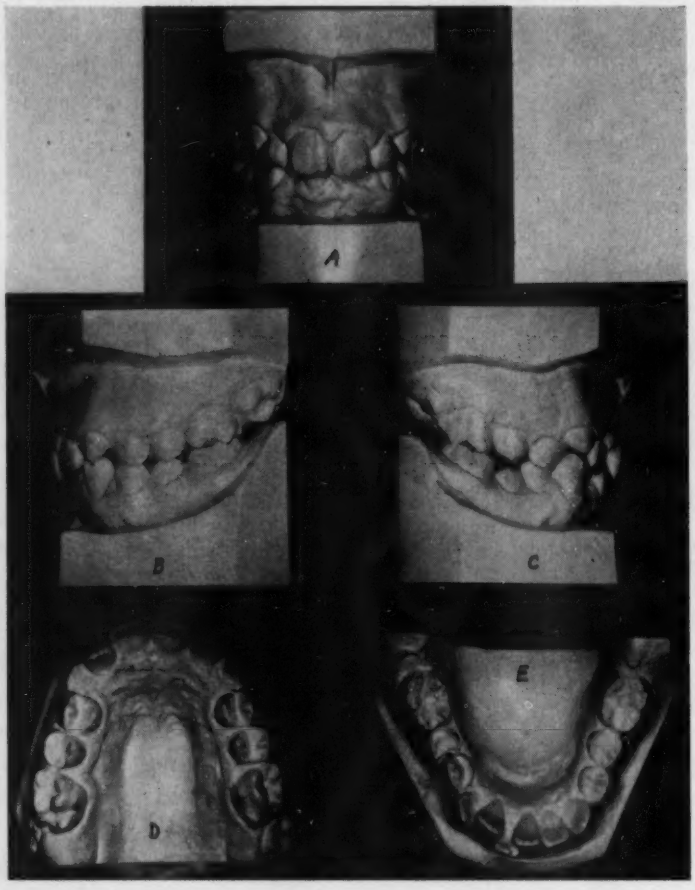

Fig. 1.—Beginning models of Patient M. W. *A*, Anterior view. *B*, Left lateral view. *C*, Right lateral view. *D*, Upper occlusal view. *E*, Lower occlusal view.

If you have not had this happen to you, then you just are not an orthodontist of this world. It has happened to me. I should like to show one of the first cases that I took to an orthodontic meeting. Figs. 1 and 2 show the beginning and finished models. This case leaves a lot to be desired in its treatment, for there are many refinements that could have been worked out. However, this was one of my early ones, and I was proud of it. The case was

treated in eighteen months, a positioner was used for six weeks, and then upper and lower Hawley retainers were worn continuously for six months and at night for another six months. All through retention we fought the lower right central incisor's tendency to move labially to its original position.

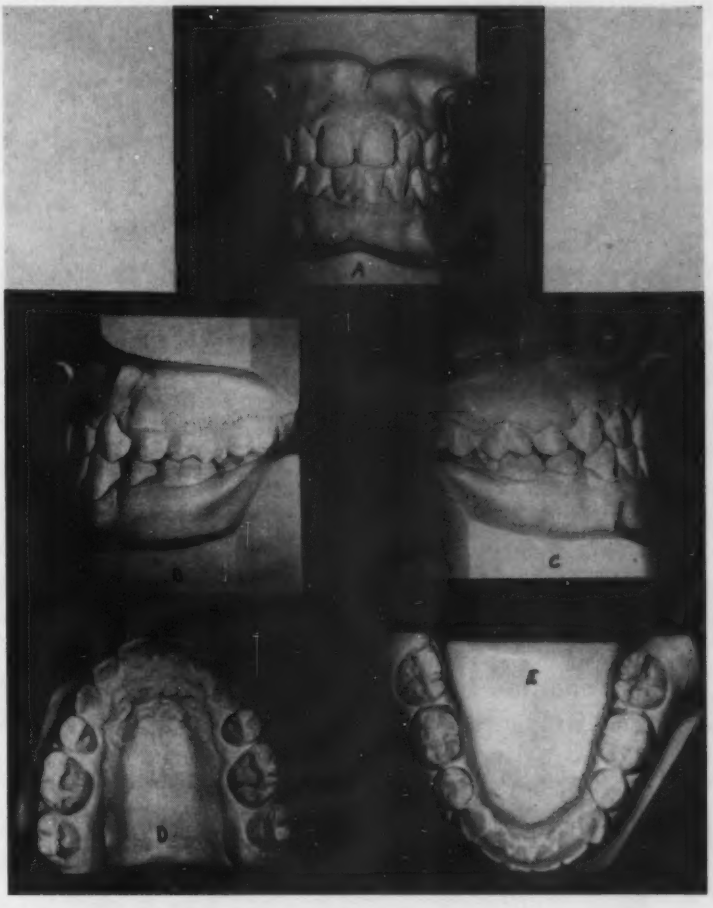

Fig. 2.—Finished models of Patient M. W. *A*, Anterior view. *B*, Left lateral view. *C*, Right lateral view. *D*, Upper occlusal view. *E*, Lower occlusal view.

Finally, the patient grew tired of coming for treatment, and I presumed that the condition must be all right, until this past summer when the patient returned home to get married. Fig. 3 shows the case some five years out of retention. The similarity of this model with the original model is utterly amazing (Fig. 4), except that the later model has only four premolars. Such cases as this have led us to look into some of the reasons why this might occur.

Fortunately, a fair percentage of our cases hold perfectly well, with or without retention. Also, fortunately for us, most of our patients are not concerned about the minor inconsistencies that may develop in posttreatment periods. Nevertheless, there are some of these relapses which are most irritating as well as time-consuming in our offices.

Retention is one of the most difficult phases of orthodontic treatment, as we all know. The more conscientious the orthodontist, the more difficult the retention problem. Volumes have been written on causes of relapse and how to avoid them. To date, we have not found as answer. With today's knowledge of growth and development, lateral headplate x-rays to show us what we have accomplished in treatment, and greatly improved mechanics and mechanisms, our profession is making great strides in obtaining fine results—results that hold better than in previous years. We must continue our efforts in these fields.

There is yet a lot to be learned about tooth movement, but there is likewise a lot to be learned about how to maintain teeth in their new positions. Since the time of Oppenheim, we have known the histology of tooth movement. The role of the periodontal membrane in tooth movement is classical. We all know that the compression of the fibers of the periodontal membrane against the bone surrounding the tooth causes the osteoclastic action which resorbs the bone and that the stretching of the fibers causes the building of bone by the osteoblasts. Since the teeth are supported in bone, it would seem that when we found the answer to the process of moving a tooth through this substance, we would solve most of the problems of orthodontics. This has not been found true.

I would like to recall for you a definition of the periodontal membrane as presented by Noyes, Schour, and Noyes[1]: The periodontal membrane is "The connective tissue which (1) fills the space between the surface of the root and the bony wall of its alveolus; (2) surrounds the root occlusally from the border of the alveolus; and (3) supports the gingivae." The second and third parts of this definition refer to the portions of the membrane that contain the connective tissue fibers with which we are concerned today and to which I should like to call your attention. The periodontal membrane does not stop at the border of the bone but continues to surround the root as far as the tissues are attached to it. It also extends into the free margin of the gum and is the means of its support, holding the gingivae close to the surface of the tooth and supporting them in the interproximal spaces.

The fibers of the periodontal membrane are distinguished from the gums, which are described as the soft tissues that cover the alveolar process and the hard palate, and from the gingivae, which are the continuation of the gum tissue from the crest of the alveolar process to the cervical portion of the tooth crown and include the septi which pass between the teeth.

According to Black,[2] the fibers of the periodontal membrane are distributed into the gingivae, into the adjacent gum tissue, and into the crest of the alveolar process and serve to bind the whole group into a compact mass about the neck of a tooth.

Arnim and Hagerman,[3] in a study of the horizontal serial sections of the human jaw, revealed that a band of compact connective tissue encircled the teeth within the marginal gingivae.

It is the connective tissue fibers that are not attached directly in bone that we want carefully to consider—whether this tissue be called periodontal

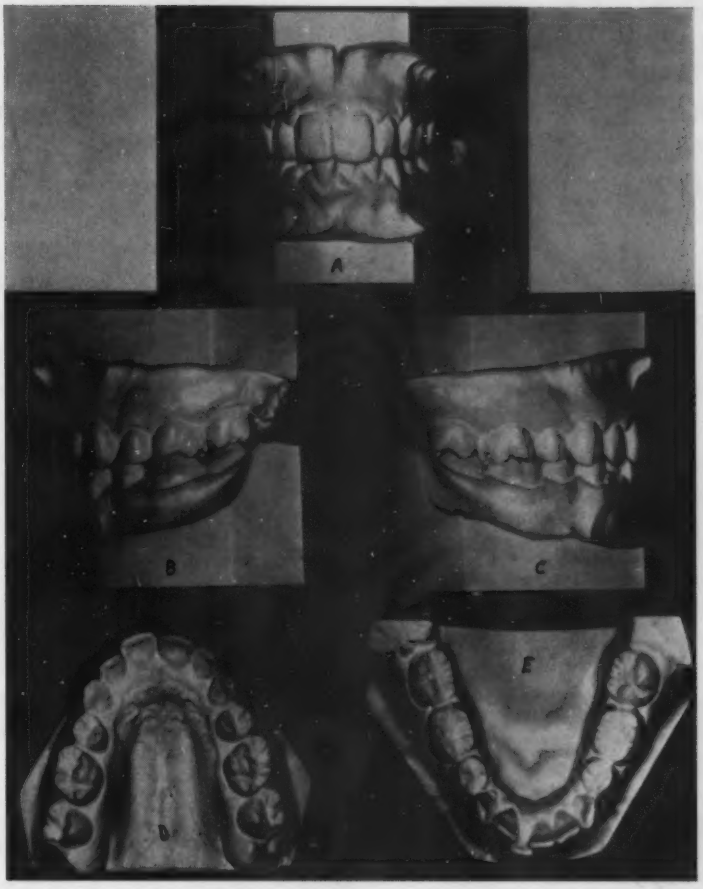

Fig. 3.—Models of Patient M. W. five years out of retention. *A*, Anterior view. *B*, Left lateral view. *C*, Right lateral view. *D*, Upper occlusal view. *E*, Lower occlusal view.

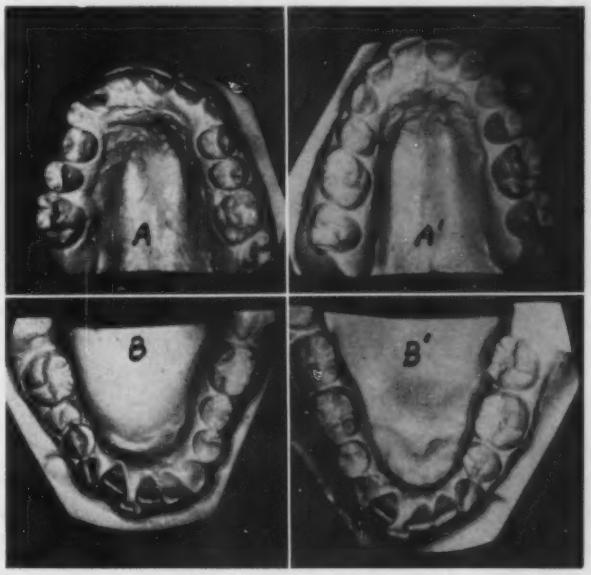

Fig. 4.—Occlusal aspect of beginning and latest models of Patient M. W. *A*, Upper beginning model. *B*, Lower beginning model. *A'*, Upper latest model. *B'*, Lower latest model.

membrane, gingivae, or gum tissue. These tissues have functions, and most texts describe three functions of the periodontal membrane: (1) a physical function, (2) a vital function, and (3) a sensory function. The physical function is manifest in the maintenance of the tooth in relation to the adjacent hard and *soft tissues.* This function of the periodontal membrane has two roles. It supports the tooth in its alveolus and sustains it against the forces of occlusion and mastication by its attachment to bone, to the gum tissue to the occlusal of the bone, and to the cementum of the adjacent tooth. *It also maintains the soft, investing tissues in their proper relation to the teeth by giving support to the gingivae and holding them about the gingival portion of the enamel.* The vital function is that of formation of bone on the alveolar wall and of cementum on the surface of the root. The sensory function is that of sensation of touch for the tooth.

In addition to protection, one of the important functions of the gingivae always listed in text, books is *maintenance of the teeth in the line of the arch.*

Dr. G. V. Black describes this function well when he states:

> The influence of the bone forming the alveolar process has been much overrated in its importance in maintaining the teeth in their positions. Hard and rigid as the bones of the skeleton seem in the dried state, bone is a very plastic tissue during life, and is subject to more or less constant resorptive and rebuilding processes. *It will not stand against a connective tissue constancy of stress.* The connective tissue group, other than active muscles, has a great function in directing the building of the body, holding organs in their places in health, and *bringing them back to place when the correction of conditions will allow them freedom of action.* There is no place in the human body where there are as fine examples of this play at control of form by the non-muscular connective tissue as in the gingivae, or so much harm from its influence when the conditions have given them a wrong direction.

It may be the function of these fibers to assist in creating a good alignment of the teeth at the time of their eruption, but after they are erupted in malalignment in the arch it is their function to maintain them there. If the maintenance of teeth in their erupted positions is one of the functions of these fibers, then orthodontists must overcome that function in their repositioning of teeth.

The chief function of the gums is said to be protection of the underlying tissues; with the connected fibers interweaving with those of the gingivae, however, undoubtedly the function of the gingivae is shared to some extent by the gums.

REVIEW OF THE LITERATURE

A review of the literature indicates that men in the past have been cognizant of these connective tissue fibers. Aisenberg[4] divided the periodontal membrane fibers, from a practical viewpoint, into two groups: one attached tooth-to-bone and the other attached tooth-to-tooth or tooth-to-subepithelial connective tissue. He wrote that the arrangement and attachment of the former group, when changes in bone are included, may be altered, but "*we*

are not so certain about being able to alter the latter group. The subepithelial tissues do not conform to tooth movement as does bone; hence this may be a factor in relapse."

Oppenheim[5] wrote: "The powerful fibers stretching across the septa, giving off strong bundles to these and partly to the gums, prove to be the *most resistive tissue with which we are dealing in our operations.*"

Erikson, Kaplan, and Aisenberg[6] reported a remarkable persistence of the transseptal fibers after teeth had been approximated in a space where a tooth had been removed. These teeth were held in approximation for almost a year, and their histologic sections showed that the connective tissue (mostly transseptal fibers) was compressed and the excess of tissue had not been removed. They concluded that there seemed to be no process which shortened these fibers or removed them.

Anyone who has attempted a gingivectomy in a section of a dental arch knows how tough and tenacious this tendinous-like band of tissue surrounding the teeth can be. If there is no process whereby Nature accommodates for readaptation of this tissue in newly formed positions of teeth, is it not a miracle that a moved tooth ever stays in its new position?

Several years ago, before the histology of tooth movement was wholly accepted, it was felt by some that there was elasticity to the bone. Skogsberg[7] performed what he called septotomies to ensure stability of his cases. He performed these operations with the idea not of neutralizing the forces within the soft tissue but of neutralizing what he felt was the elasticity of the tissue of the cancellous portion of the bone. He presented evidence of his theory in a large number of clinical case histories. His cases were those with rotations, diastemas, lingually and labially malpositioned teeth—all calling for movements that prove difficult in retention.

With his septotomy, the stability of the results seemed improved. Perhaps he did neutralize some of the fibers attached to bone. Probably more important, however, he neutralized other connective tissue fibers of the gingivae, periodontal membrane, and gums with his technique.

The seeming elasticity of the forces that tend to return teeth to their original positions has probably diverted our attention away from the connective tissue fibers, for we have learned that the fibers of the periodontal membrane, gums, and gingivae are *inelastic.* However, these fibers do not travel in a straight line. They have been described as wavy in appearance. This is the characteristic that permits the slight movement of the tooth in its socket. The degree of this waviness has not been described, but it has been shown histologically that some of these fibers may be extensively elongated simply by straightening out this waviness.[8] If these fibers weave in and about and around other fibers, as well as vessels and nerves, it is not too difficult to imagine that, even though they are inelastic, we have a mechanism not too different than that of the familiar coil spring. Wire, that with which we move teeth all the time, is also a nonelastic material. It does not move teeth by virtue of the elasticity within itself, but when contoured in certain fashions it delivers very effective forces. The coil spring is today one of our most

efficient devices for obtaining tooth movement. If we could imagine, then, that in the inelastic connective tissue fibers surrounding the tooth we have numerous coil springs both pulling and pushing when the position of a tooth is interfered with, we could arrive at some conception of what forces might have to be overcome to make that moved tooth remain in its new position.

MATERIALS AND METHODS

In 1954, through the efforts of Dr. Hugh I. Myers, chairman of the Research Division, School of Dentistry, University of Kansas City, a research grant was obtained for the purpose of investigating the supra-alveolar fibers in relation to orthodontic tooth movement. I might mention here that I am not an orthodontics teacher; nor am I a man who has much time to devote to orthodontic research. I am a practicing orthodontist with a full practice and take part of my free time to work on this research project with Dr. Myers.

Over the past four years, we have acquired some forty monkeys and performed experimental procedures on them. A preliminary report on our work was published in the AMERICAN JOURNAL OF ORTHODONTICS in July, 1958.[11] For those of you who have not seen the published material, I might review, in brief, the nature of our project.

Cynomolgus monkeys have proved to be the animal of choice for experimentation. Anterior teeth (permanent) were used in the experiments. One of the incisors was removed, and the teeth adjoining the space were moved into approximation. The proximating teeth were banded, and a short section of 0.010 inch coil spring was placed on a section of 0.018 inch stainless steel arch wire. The section of arch wire was contoured passively into the brackets on the bands, and tension was placed on the spring by tying it to the terminal ends of the sectional arch. The spring was tightened at three-week intervals. We found that in about sixteen to twenty-four weeks the bands on the approximated teeth were in contact. No attempt was made to keep the teeth in an upright position. In the first experiments approximation was considered complete when the bands were in contact. In later experiments the bands were removed when contact was made, and the distogingival tooth surfaces were notched to hold a ligature wire. The ligature wire, when tightened, brought the teeth into absolute contact.

The control animals were held with the teeth in contact for approximately three weeks and then were released from any orthodontic forces.

The experimental animals were given a complete and thorough gingivectomy around the approximated teeth as soon as contact was secured. After allowing three weeks for the gingivectomy to heal, we removed the ligature wire.

After the teeth were released from orthodontic forces, both the control and experimental animals were observed periodically for a period of six to twenty-six weeks. They were then sacrificed, and the jaws were preserved for future histologic sectioning.

Identical procedures were followed on opposite sides in the upper and lower arches of the same animal. To date, we have only macroscopic results

to report. We have quantities of histologic slides to be studied and evaluated but, as you can imagine, this is a very time-consuming process.

I have chosen one of our control animals and one of our experimental animals to present as examples of our procedure and results. Fig. 5 shows one of our control animals. The upper arch was the site of operation, and the upper right central incisor was removed. The upper left central incisor and the upper right lateral incisor were banded, and the appliance was placed to move the teeth together. After fifteen weeks the teeth were ligated into absolute contact. Three weeks later the ligature was removed. Ten weeks after removal of the ligature the space had reopened somewhat. The relapse in this case was only about 20 per cent; we have others in which the amount of relapse increased up to 82 per cent.

Fig. 5.—Control animal. *A*, Site of experimentation. *B*, Tooth extracted and appliance in place. *C*, Teeth approximated and ligature in place. *D*, Position of teeth when ligature removed. *E*, Ten weeks after ligature was removed showing 20 per cent of space reopened.

Fig. 6 shows one of the experimental animals. Again, the upper incisor region was selected for this procedure. In this animal the upper left central incisor was removed and the same type of appliance used in the control animal was placed. Twenty-four weeks after the movement was started a ligature was placed, which brought the teeth into absolute contact. Three weeks later a complete gingivectomy was performed around the proximated teeth. The ligature wire was left in place at the time of the gingivectomy but was removed three weeks later. Twenty-one weeks after the removal of all orthodontic forces the right central incisor and the left lateral incisor were still

in good contact. The tissue response in this animal was good throughout the experiment, and this result was obtained in the absence of serious complicating factors. Some of our experimental cases have not been this good. Table I shows a random sample of our results in both arches of six animals.

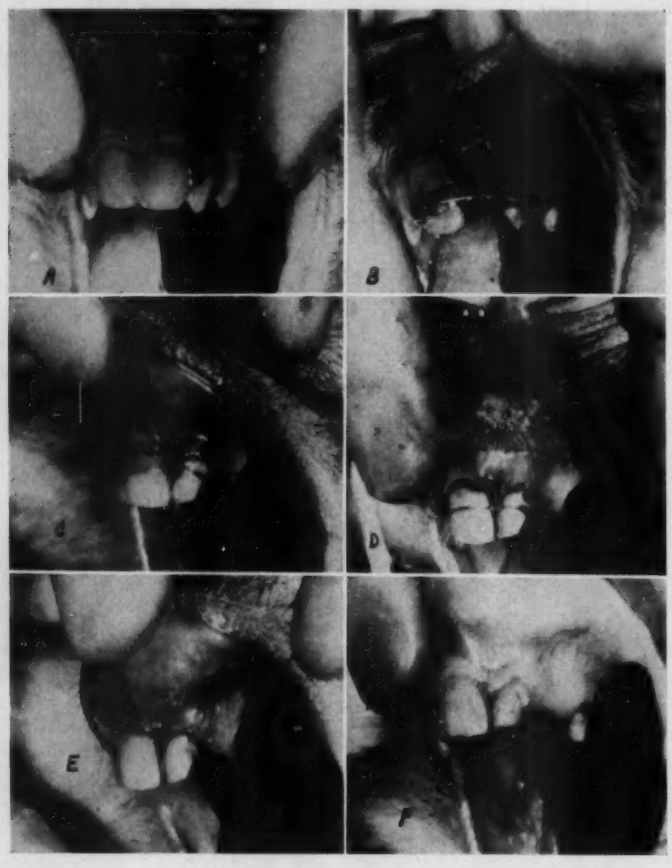

Fig. 6.—Experimental animal. *A*, Site of experiment. *B*, Upper left central incisor extracted and appliances in place. *C*, Teeth in absolute contact with ligature in place. *D*, Gingivectomy around the approximated teeth. Ligature left to maintain the teeth in contact for three weeks. *E*, Three weeks after gingivectomy with ligature removed. *F*, Twenty-one weeks after teeth were relieved of all orthodontic appliances.

The average difference in relapse of 10 per cent for the experimental animals, in comparison with 44 per cent for the control animals, would indicate that the gingivectomies were definitely a factor in the maintenance of the original orthodontic tooth movement.

DISCUSSION

We have yet to determine whether there will be any correlation of the histologic findings and the clinical findings. To date, our clinical evidence seems encouraging. We are not at all sure that surgical procedures are the method of choice in neutralizing these forces within the connective tissue. In the reparative processes of healing new forces may be generated. In this

TABLE I. THE INFLUENCE OF GINGIVECTOMY ON RELAPSE AFTER ORTHODONTIC TOOTH MOVEMENT

ANIMAL NO.	ARCH	TIME FOR APPROXIMATION OF TEETH (WEEKS)	TERMINAL OBSERVATION TIME (WEEKS)	PER CENT DRIFT		COMPLICATIONS
				EXPERIMENTAL	CONTROL	
8	Upper	17	17	0		
8	Lower	17	17	0		
9	Upper	15	17	10		
9	Lower	15	17	14		Teeth mobile
12	Upper	26	19		31	Band caused partial gingivectomy
12	Lower	21	24		82	Lost ligature
13	Upper	25	17		28	Canine eruption
13	Lower	18	24		37	Poor tissue
14	Upper	16½	21	8		Teeth mobile
14	Lower	16½	21	42		Teeth mobile
15	Upper	24	26	0		
15	Lower	24	26	13		Teeth mobile
			Average	10%	44%	

atomic age it may be that the radioactive isotopes may supply a new method of approach to the problem. Injections have been made which produce a necrosis of the underlying connective tissue and at the same time leave the epithelium intact and healthy. As yet, however, they are purely experimental. If some method of control for these chemical injections could be found which would limit their action to confined areas, then we might be getting at a better method of approach to the problem of controlling the forces built up in these fibers.

Since a meeting of this type is of interest more to the clinical or practicing orthodontist, it does not seem appropriate to go further into the possibilities of research in this field. Instead, I believe that it would be better to stimulate your thinking as to the potentialities of the tissues with which you work every day, namely, those of the supra-alveolar tissues.

We have not found the method to control the actions and reactions of these fibers, and we are *not* recommending gingivectomies as routine procedure following treatment of an orthodontic case. My objective is merely to give you some ideas in the hope that together we may come upon something that may be of benefit to all of us.

With our knowledge of this very tough, tendinous-like, interwoven, fibrous linkage of all dental units in one continuous band or chain from second molar to second molar, I should like to mention a few tooth movements which might be explained in the light of the persistence of this band and its inability to readapt itself.

There are numerous manifestations of the theoretical potentialities of these connective tissue fibers in orthodontics. The familiar spacing of the incisors that accompanies the distal movement of canines where premolars have been removed comes immediately to mind. Even when the anterior teeth are engaged in the arch wire, these teeth tend to space unless ligated together. A pretty powerful force is needed, for this is a bodily movement. If we

visualize the attachment of the tooth-to-tooth fibers, we rationalize that the distal movement of the canine exerts a stretching action on the fibers attached to the distal aspect of the lateral incisor, and this coil-spring action causes it, too, to move distally. The same mechanics permit the distal movement of the central incisor. If we tie these anterior teeth to keep them in contact, then

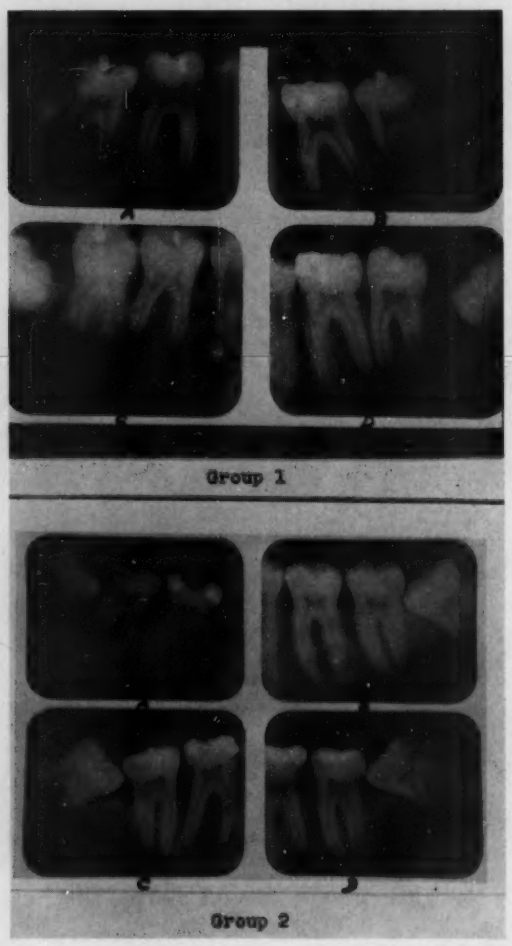

Fig. 7.—Group 1. Second and third molar relationships when third molar is covered by bone. *A*, Upper left; left side prior to mesial movement of second molar. *B*, Upper right; right side prior to mesial movement of second molar. *C*, Lower left; left side after mesial movement of second molar. *D*, Lower right; right side after mesial movement of second molar.

Group 2. Second and third molar relationships when third molar is not covered by bone. *A*, Upper left; left side prior to mesial movement of second molar. *B*, Upper right; right side prior to mesial movement of second molar. *C*, Lower left; left side after mesial movement of second molar. *D*, Lower right; right side after mesial movement of second molar.

it may be that we are putting further strain on our anchorage in the distal movement of the canine. This same type of action does not take place, however, in other areas of the mouth. When a second molar with a third molar in close proximity at the distal area is moved mesially, the third molar does not follow when it is completely covered by bone (Fig. 7). In fact, this serves as good testimony regarding the amount of anchorage that was lost in treatment. In cases where the third molar is through the bone, it does follow the

mesial movement of the second molar (Fig. 7). Now, if it were the fibers within the bony framework of the jaws that brought about this spacing of the anterior teeth with the distal movement of the canines, why did not the third molar come forward when the second molar was moved? It would be a natural conclusion that it must be the fibers that are above the bone that are responsible for this action.

Another common tooth movement is the movement of protruding maxillary incisors lingually. When this is done, we are compressing the tissue on the lingual or palatal aspect. This frequently is evident to the eye in an extra bulk of tissue in this area. Yet, in our retention of such a movement, we place the usual Hawley retainer over this tissue, which confines it further and adds greatly to the forces of these fibers to move the teeth back labially again; all too frequently they do just that.

The fibers *may* be at play when anchorage is prepared by tipping the posterior teeth distally. It may not be so much the tent pole, toe hold resistance of the tooth in bone as it is the distal tension placed on the supra-alveolar fibers that permits easier distal movement of the anterior segment, thus permitting less mesial movement of the buccal segments.

In depressing and elongating movements, this bundle of connective tissue fibers enmeshing the teeth may be one of the offenders in the retention of vertical overbite.

In tooth eruption itself, the proliferation of the pulpal tissue at the root end against a band of connective tissue fibers, which is resistant and protects the underlying bone from resorption, is what permits movement of the tooth only toward the surface of the jaw instead of the growth of the root into the jaw itself.

It has been said that the connective tissue fibers of the periodontal membrane and gingivae are not as easily injured under tension as under pressure.[9] If this is true, it might explain why expansion treatment cases are more prone to relapse than those in which arch length is shortened. The injuries to these fibers are greater in cases treated with the removal of dental units and their compression than in cases in which the fibers are stretched to increase arch length and gain room for the admittance of crowded-out dental units.

Still another example of the power of these fibers of the gums, gingivae, and periodontal membrane is found in the treatment of the cleft palate case. Correction of the usually present buccal cross-bite results in severe stretching of the fibers. They require indefinite mechanical retention.

This connective tissue band around the teeth could be pertinent to the work done by Dr. Hayes Nance. He showed that arch length could be increased, but that, when it was out of retention, it had a tendency to return to its original length.

Likewise, the same band of fibers might play a role in Strang's axiom of mandibular canine width. The distance between the cusps of the canines

must be maintained; else, we can expect return to that dimension upon release of mechnical retention.

Again, we wonder if the migration of teeth in periodontal disease might be explained along the same line of reasoning. The atrophy of the interdental papilla in the vertical type of periodontal disturbance eliminates the fibers which have as their function the maintenance of the tooth in the line of the arch. An early characteristic clinical symptom of this type of disease is the separation of the teeth.[10] A good conjecture is that the fibers (supra-alveolar) hold one group against another in maintaining the teeth in their erupted positions and that under normal conditions the inherent forces of the various fibers are accurately balanced. At any rate, with the destruction of the interdental fibers, the teeth are moved away from the injured area, which would indicate some sort of a tonicity or balance between the fibers.

Hypertrophic gingivitis is characterized by separation and protrusion of the teeth. Diffuse fibromatosis of the gingivae causes frequent distortion of the position of the teeth.

Finally, this band of supra-alveolar connective tissue is probably performing its function in the re-establishment of tight contact points after a full orthodontic appliance is removed. After a double thickness of band material has been present between teeth for one and one-half to two years or longer, is it not amazing that in a matter of just a few days there is a snapping contact once again in cases in which the teeth were in contact previous to treatment, whereas in cases in which there was slight spacing between the teeth there is a tendency for these spaces to open after bands are removed?

In the light of all this evidence, I believe that you might agree that these fibers are capable of moving teeth and that they do play an important role in maintaining the teeth in their erupted positions.

SUMMARY

In summary, I should like it clearly understood that I do not recommend that a gingivectomy be performed on our cases after tooth movement has been completed. We performed the gingivectomy on our experimental animals merely because it was the only way we knew to completely get rid of the fibers which we felt were influencing our relapses. More recently we have been performing these gingivectomies prior to the tooth movements to see what effect, if any, this might have on tooth movements. Our work has not progressed to the stage where we can make any specific clinical application of our findings.

Some clinical experimenting has been done on cases presenting a diastema between the upper central incisors. In these, we band the teeth and bring them into contact with a technique similar to that used on the monkeys. After the bands are approximated, the excess tissue between the teeth is removed surgically, and incisions are made on the distal aspect of the teeth in the interproximal region. After these have healed for three weeks, the

bands are removed, and an 0.010 inch ligature wire in a figure of eight is placed around the teeth to bring them into absolute contact. About six to eight weeks later the ligature is removed. Some of our results have been good; others have been disappointing. We feel, however, that the percentage of relapse is less than we had previous to the use of this technique. More than likely, we are unable to remove enough of the forces of the connective tissue fibers that may be attempting to return the teeth to their previous positions. The fibers on the labial and lingual aspects of the tooth have not been disturbed, so we are probably disturbing somewhat less than one-half of the fibers that may be acting upon these teeth (Fig. 8).

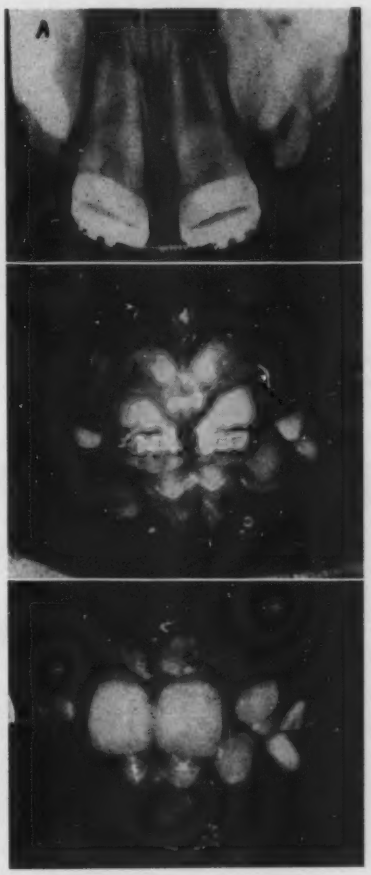

Fig. 8.—Correction of diastema. *A*, Roentgenogram of diastema with appliance in place for closure of the space. Note the unerupted lateral incisors. *B*, Teeth approximated. Note the bulk of tissue between the central incisors. *C*, After tissue has been removed surgically. Lateral incisors did not move mesially upon eruption.

There is one case in which a completely lingually placed lower lateral incisor and a completely lingually placed upper lateral incisor on opposite sides of the mouth were subjected to the removal of some tissue surgically after the completion of orthodontic treatment. The tissue on the labial aspect of both of these lateral incisors was bulky when the teeth were put into their

Fig. 9.—Beginning models of Patient D. W. *A*, Anterior view. *B*, Left lateral view. *C*, Right lateral view. *D*, Upper occlusal view. *E*, Lower occlusal view.

Fig. 10.—Models of Patient D. W. two years out of retention. *A*, Anterior view. *B*, Left lateral view. *C*, Right lateral view. *D*, Upper occlusal view. *E*, Lower occlusal view.

new positions. This was removed. There has been only a slight relapse of one of the teeth operated on to date, and the patient has been out of retainers over two years (Figs. 9 and 10).

We have treated other cases in which we anticipated trouble in the retention period and none developed. We can all be thankful that there are such cases as these.

CONCLUSIONS

I do not believe that we would rid ourselves of all orthodontic problems even if we could find a method of control over these connective tissue fibers. I believe that a case will still have to be thoroughly analyzed and that all available modern diagnostic aids will have to be used in planning orthodontic procedures. I do believe, however, that with a knowledge of how to handle these forces there might be a greater freedom in treatment planning. Such control might shorten the duration of treatment and alleviate some of our retention difficulties.

An effort has been made to stimulate your thinking with respect to the potentialities of the connective tissue fibers surrounding the teeth and not attached in bone.

I have presented some experimental data which indicate that the removal of these fibers surrounding moved teeth may reduce the percentage of relapse.

Clinical findings have been reviewed in the light of the persistence and inadaptabilities of this connective tissue band of fibers surrounding the teeth.

If this dissertation does nothing more than to make you, as practicing orthodontists, more soft-tissue conscious and bring you to the realization that you are working with a tissue other than bone, which demands a great deal of respect, then the preparation of the data has been worth while.

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6314 BROOKSIDE PLAZA.

RECENT STUDIES ON GROWTH OF THE BODY AND FACE

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THIS discussion presents an ordered abridgment of some recent studies on child growth. Its major sections deal with (1) variables related to body size in childhood, (2) growth trends for the childhood years, (3) growth interrelationships, and (4) frames of reference for clinical use. The materials selected for inclusion in the first section pertain largely to the height and weight of the body; those included in the latter sections refer mainly to the face and dental arches.

VARIABLES RELATED TO BODY SIZE IN CHILDHOOD

Socioeconomic Status.—Recent findings[19] on the association between socioeconomic status and body size are shown graphically in Fig. 1. The subjects were white boys of northwest European ancestry, representing the childhood period from 7 to 10 years of age. They were studied during 1950 at seventeen public elementary schools in Eugene, Oregon. The socioeconomic distribution was subdivided into three segments, and the two terminal segments were compared. Subdivision was based upon the vocation of the principal wage earner of the family. Twenty-six per cent of the subjects comprised the "professional and managerial" segment, 25 per cent comprised the "semiskilled and unskilled" segment, and 49 per cent were in the excluded (middle) segment. On the basis of this and other studies,[9, 37] the following generalization may be drawn with reference to the period of middle childhood: The North America white child typifying the professional and managerial portion of the socioeconomic continuum is 1 inch taller and 3 pounds heavier than the child typifying the unskilled and semiskilled portion of the continuum. Fig. 1 shows also that children of the professional and managerial occupational groups tend to be larger than those of the unskilled and semiskilled groups in length of the upper and lower limbs, girth of the trunk and limbs, and width of the shoulders and hips.

Racial Background.—In 1956 and 1957 Greulich[4] measured the height and weight of American-born boys of Japanese descent living in the San Francisco Bay area of California. Comparable measurements on American-born boys of

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Dutch descent were amassed by Spurgeon[41] in 1957 and 1958 at Holland, Michigan.* Table I presents the averages from these data at the ages of 7 years, 11 years and 15 years. It will be seen that (1) at each age the American Dutch boys are taller and heavier than the American Japanese boys, and (2) the differences become greater with age.

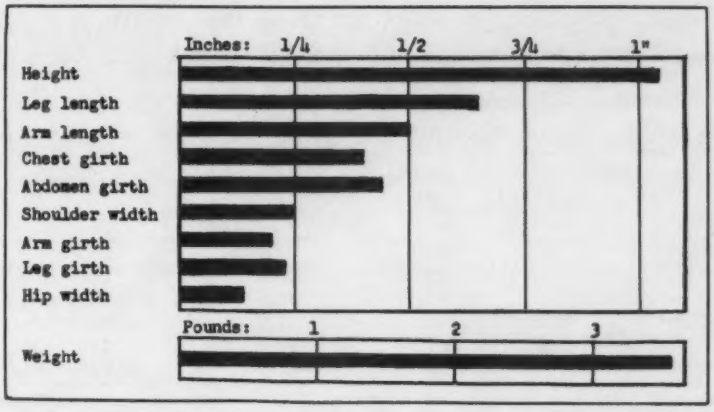

Fig. 1.—Chart showing the average amounts by which boys representing the "professional and managerial" socioeconomic group are larger than those representing the "semi-skilled and unskilled" group. The data were amassed in 1950 on North American white boys 7 to 10 years of age.

Shown in Table II are averages for height obtained on six other groups of American children differing in racial background. Each of these averages represents children of both sexes residing in the southwest region of North America during the decade from 1930 to 1939.[3, 11, 37-39, 42, 44] Selected differences from Table II at the age of 10 years are (1) children of Pueblo Indian lineage are 2 inches shorter than those of Navaho Indian lineage, and (2) American Chinese and Pueblo Indian children are 3 inches shorter than American Negro and white children.

TABLE I. HEIGHT AND WEIGHT MEANS FOR NORTH AMERICAN BOYS OF DUTCH AND JAPANESE ANCESTRY

MEASUREMENT	ETHNIC GROUP	AGE IN YEARS		
		7	11	15
Height (inches)	American Dutch*	48.2	57.6	67.6
	American Japanese†	46.4	55.2	64.8
	Difference	1.8	2.4	2.8
Weight (pounds)	American Dutch*	54.2	85.9	135.0
	American Japanese†	52.2	80.3	127.2
	Difference	2.0	5.6	7.8

*Data collected in 1957 and 1958 in Michigan[41]; N's 77, 73 and 95, respectively.
†Data collected in 1956 and 1957 in California[4]; N's 52, 36 and 31, respectively.

Findings on the average size of North American white boys of Finnish and Italian ancestry are available from a study made in 1938 and 1939 in

*Every subject included in this study had at least three grandparents of Dutch ancestry. For 60 per cent of the subjects, all four grandparents were of Dutch ancestry.

thirty communities within a radius of 50 miles of Hibbing, Minnesota.[12] This study extended from the age of 6 years to the age of 17 years and encompassed sixteen different measurements. At all ages the American Finnish boys were found to be larger than the boys of Italian lineage in head length, chest girth, height, weight, and size of the upper and lower limbs. During the age period from 12 years to 17 years, the averages on these two ethnic groups (1) did not differ for head width or face width, but (2) did differ for head length by 2 to 3 mm., for height by 1 inch, and for weight by 1 to 3 pounds.

TABLE II. HEIGHT MEANS FOR NORTH AMERICAN CHILDREN OF SIX ETHNIC GROUPS

GROUP*	AGE 7 YEARS		AGE 10 YEARS	
	N	MEAN (INCHES)	N	MEAN (INCHES)
Pueblo Indian[38]	408	44.9	386	50.9
Chinese[39, 44]	292	45.0	366	50.8
Mexican[11]	2,180	46.5	2,253	52.6
Navaho Indian[42]	200	47.2	339	53.2
Negro[11]	407	47.8	410	54.0
White[3, 11, 37]	12,480	47.9	14,548	54.1

*All groups studied during the decade from 1930 to 1939 in the southwestern section of North America (Arizona, California, New Mexico, and Utah).

Secular Period.—Besides varying in relation to ancestry and socioeconomic class, the body size of children varies from generation to generation, that is, with secular period. This may be demonstrated by comparing the height and weight averages for groups of North American children measured recently with those for children measured twenty-five and fifty years earlier.

TABLE III. HEIGHT AND WEIGHT MEANS FOR AMERICAN JAPANESE CHILDREN IN TWO SECULAR PERIODS*

MEASUREMENT	SECULAR PERIOD	AGE IN YEARS		
		7	9	11
Height (inches)	1956-1957†	46.5	50.4	55.1
	1931‡	45.0	48.5	52.5
	Difference	1.5	1.9	2.6
Weight (pounds)	1956-1957†	49.6	61.9	79.6
	1931‡	45.9	53.1	65.7
	Difference	3.7	8.8	13.9

*Both samples obtained in the San Francisco Bay area of California.[4, 39]
†N's are 86, 63 and 69, respectively.
‡N's are 81, 80 and 73, respectively.

Table III assembles findings at 7, 9, and 11 years of age from investigations made by Preston[39] in 1931 and by Greulich[4] in 1956 and 1957. The subjects for both investigations were American Japanese children residing in the San Francisco Bay area of California. It will be seen that during the quarter-century spanned (1) there occurred substantial increases in height and weight, and (2) for both measures the increase was progressive with advance in age. Assembled in Table IV are height and weight averages at the ages of 7, 10 and 15 years obtained on American white boys measured in 1892[2] and in 1950.[32, 35] The 1892 sample was drawn in northern California and the later sample in

west-central Oregon. Again, increases with respect to time and age are indicated. Note, for instance, that the 15-year-old boys of 1950 were approximately 4 inches taller and 20 pounds heavier than comparable boys preceding them in time by a half-century.

To be set in perspective, the materials presented in Tables III and IV must be supplemented with findings on secular variation at earlier and later ages. By synthesizing North American research at successive ages from birth to early adulthood,[14-16, 30] the following generalization for height is secured: compared with children living in 1900, children of today are about the same size at birth, 2 inches taller at the age of 3 years, 3 inches taller at the age of 10 years, 4 inches taller at the ages of 13 years (girls) to 15 years (boys), 2 inches taller in late adolescence, and less than 1 inch taller in early adulthood.

TABLE IV. HEIGHT AND WEIGHT MEANS FOR NORTH AMERICAN WHITE BOYS IN TWO SECULAR PERIODS

MEASUREMENT	SECULAR PERIOD	AGE IN YEARS		
		7	10	15
Height (inches)	1950*	48.1	54.6	66.6
	1892†	45.6	51.5	62.7
	Difference	2.5	3.1	3.9
Weight (pounds)	1950*	52.7	72.5	132.5
	1892†	47.5	63.4	110.2
	Difference	5.2	9.1	22.3

*Data collected in Oregon; N's 260, 208 and 102, respectively.[22, 38]
†Data collected in California; N's 168, 223 and 137, respectively.[2]

GROWTH TRENDS FOR THE CHILDHOOD YEARS

Group Trends.—In the study of human physical growth, few interests have a history as long or as sustained as that of investigating the group trend for different body traits. A group trend is derived by obtaining averages for a trait at successive ages, plotting these averages on graph paper, and drawing a curve to reveal the over-all course of growth. Fig. 2 depicts the group trend for each of ten traits[13, 40]; it was compiled to illustrate the diverse ways in which growth during childhood is known to take place.

Several recent publications from the Facial Growth Study* have presented group trends for dimensions and proportions of the face. Fig. 3 shows the trend for upper face width (bizygomatic diameter)[21] in comparison with that for head width (biparietal diameter).[20] Both trends are drawn to series of composite averages derived from Facial Growth Study data and from numerous other studies of North American white boys. Attention is called to the fact that although each dimension has a course of fairly regular average increase throughout the period from the ages of 4 to 20 years, the increase for upper face width (29 mm.) is twice that for head width.

*A long-term investigation begun at the State University of Iowa in 1946 under the joint sponsorship of the Department of Orthodontics and the Child Welfare Research Station. Since 1956 it has been supported in part by a research grant, D-217, from the National Institute for Dental Research of the National Institutes of Health, United States Public Health Service.

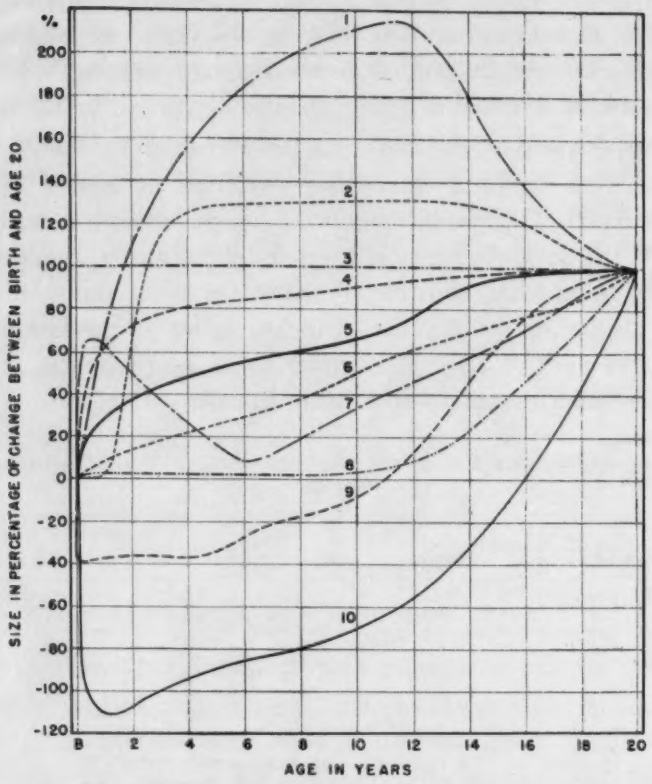

Fig. 2.—Trends of human growth for the period from birth to young adulthood. The ten traits depicted are (1) weight of the thymus gland, (2) volume of the pharyngeal tonsil, (3) size of the bones of the inner ear, (4) width of the head, (5) width of the hips, (6) weight of the pituitary gland, (7) thickness of the subcutaneous adipose tissue on the thorax, (8) volume of the testes, (9) length of the uterus, and (10) weight of the suprarenal glands.

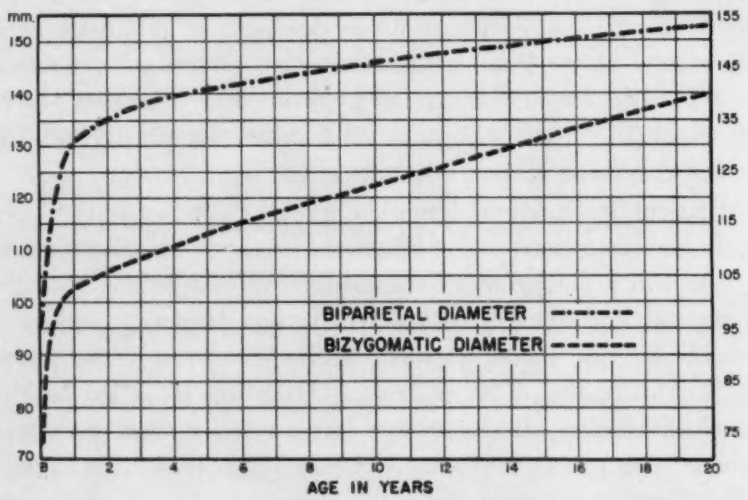

Fig. 3.—Growth trends for head width and upper face width over the period from birth to young adulthood. Each curve is drawn to composite means at successive ages for North American white boys.

Fig. 4 reproduces the group trend in each sex for lower face width (bigonial diameter) reported in a 1956 publication.[36] These trends were obtained from a serial radiographic study of seventy-two white children over the period from age 5 years to age 11 years. It will be seen that each trend has an upward slope of diminishing steepness, that is, lower face width increases during childhood at a declining velocity. In two 1958 reports[24, 29] utilizing many of the same subjects, similar group trends were obtained for nasal height (distance from nasion to anterior nasal spine) and for nasal height expressed as a percentage of subnasal height. Considering the two sexes jointly, the trend for nasal height rose from 39.2 mm. at the age of 5 years, through 43.5 mm. at the age of 8 years, to 46.9 mm. at the age of 11 years; that for nasal height in relation to subnasal height rose from 73.0 per cent at the age of 5 years, through 76.5 per cent at the age of 8 years, to 79.0 per cent at the age of 11 years. In both instances, these values and those for ages 6, 7, 9, and 10 years lie along a smoothly rising curve that is moderately concave to the age base line.

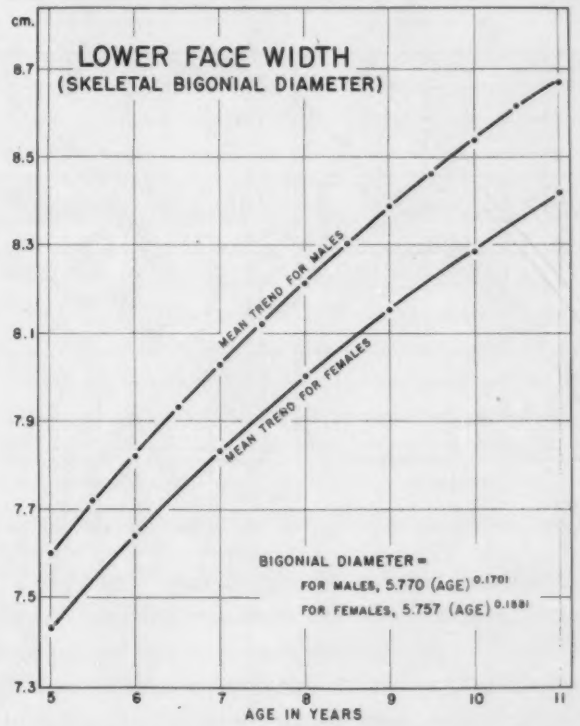

Fig. 4.—Trends for lower face width obtained from longitudinal roentgenographic study of North American white children.

Individual Trends.—The results obtained from a 1958[24] analysis of individual growth in nasal height are displayed in Fig. 5. Examination of the upper left portion of this graph reveals that, for the childhood period from the age of 5 years to the age of 12 years, 69 per cent of the children studied had a trend that ascended in a path concave to the age base line. The lower right portion of the

graph shows the specific trends for two children, thereby depicting the range of variation within the concave class. Other recent studies[22, 36] have reported finding childhood trends of the same parabolic form for 70 per cent of children in lower face width, 90 per cent of children in lower limb length, and 11 per cent of children in leg girth.

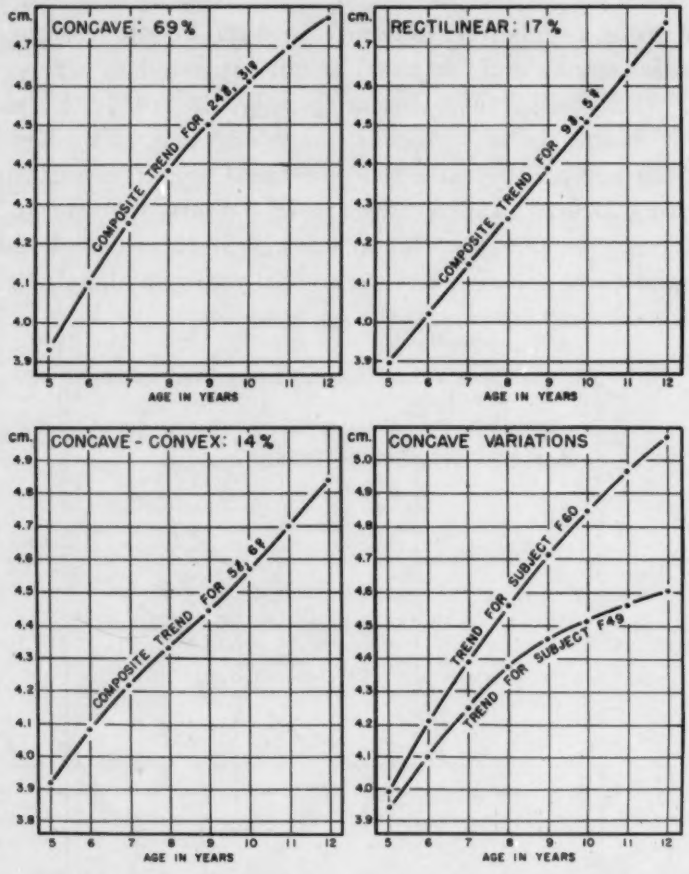

Fig. 5.—Trends portraying varieties of individual growth in nasal height.

The upper right-hand portion of Fig. 5 indicates that 17 per cent of the children in the nasal height study grew in a rectilinear manner, that is, their nasal height trends for the age period from 5 years to 12 years were ascending straight lines. Individual trends of this type characterized 25 per cent of the children studied with respect to lower face width,[36] 10 per cent of those studied for lower limb length,[22] and 44 per cent of those studied for leg growth.[22]

The lower left-hand portion of Fig. 5 shows that 14 per cent of the nasal height trends were concave to the age base line in early childhood and convex to the age base line in late childhood. Three per cent of the trends for lower face width were similar (see the lower right-hand portion of Fig. 6).

Selected pairs of individual trends for lower face width are graphed in Fig. 6 to illustrate divergence with advance in age (upper left panel), convergence with advance in age (lower left panel), and crossing in middle childhood (upper right panel).

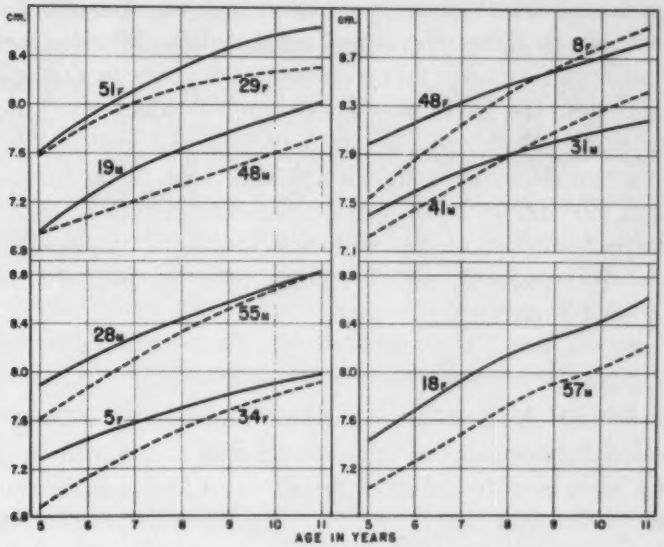

Fig. 6.—Curves illustrating individual differences among North American children in growth of lower face width.

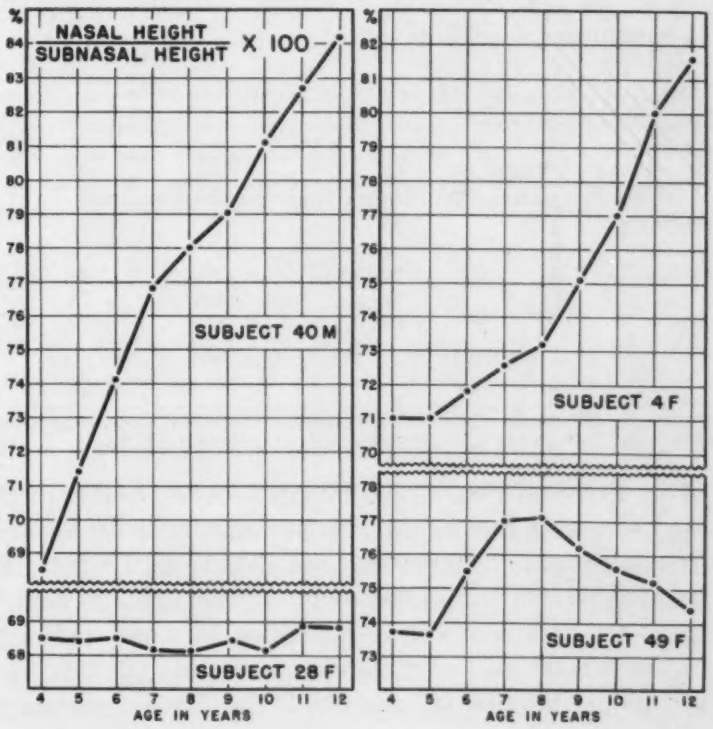

Fig. 7.—Four curves for orthodontically normal children showing individual differences in the age trend for nasal height expressed as a percentage of subnasal height.

Turning from measures of size to measures of form, Fig. 7 reproduces four individual curves for nasal height in percentage of subnasal height. The investigation from which these curves are drawn utilized radiographs of fifty-five children studied longitudinally from the age of 4 years to the age of 12 years.[29] Subject 40M showed the greatest change, and Subject 28F showed the least change. More than 50 per cent of the children had either oblique rectilinear trends or rising trends concave to the age base line. The curves in Fig. 7 for Subjects 4F and 49F depict other varieties of change that were found. Another recent longitudinal study[23] on the anterior profile of the mandible has shown wide individual differences in profile change over the period from the age of 4 years to the age of 14 years.

GROWTH INTERRELATIONSHIPS

Face and Dental Arch Relations.—The hypotheses of Izard[10] and Berger[1] on the association between dental arch width and face width in orthodontically normal persons have been tested at different childhood ages in four studies published between 1951 and 1957.[7, 8, 27, 28] Representative findings from these studies, together with additional findings not previously reported, are assembled in Table V. In general, the coefficients obtained from correlating face widths and arch widths in childhood are below $\underline{r} = 0.4$. This signifies that the orthodontist would operate at a poor level of efficiency (his estimates would be less than 10 per cent efficient[5]) were he to derive "correct" arch widths for child patients from measurements of face width.

TABLE V. FACE AND DENTAL ARCH RELATIONSHIPS IN CHILDHOOD

ARCH WIDTH*	AGE IN YEARS	MALES		FEMALES	
		N	r	N	r
Bizygomatic Width With Maxillary Arch Widths					
c - c	5	73	0.24	77	0.28
	7	72	0.22	73	0.31
e - e	5	36	0.31	34	0.33
	7	69	0.41	71	0.37
6 - 6	11	39	0.32	39	0.39
Bigonial Width With Mandibular Arch Widths					
c - c	5	73	0.10	35	0.25

*Symbols denote maximum interbuccal distance between deciduous canines (c - c), deciduous second molars (e - e), and permanent first molars (6 - 6).

Dental Arch Interrelations.—Associations between widths of the maxillary dental arch and corresponding widths of the mandibular dental arch have been studied in three investigations reported from 1954 to 1957.[8, 25, 28] The measures correlated included widths at the deciduous canines on boys and girls 5 years of age, widths at the deciduous second molars on boys and girls 4 years of age, and widths at the permanent first molars on boys and girls 9 years of age. All of the obtained r's are between 0.7 and 0.9, indicating a moderate positive relationship.

In two of the foregoing studies,[8, 25] covariation was investigated for maximum interbuccal and minimum interlingual widths of the dental arches taken

between selected teeth. For each arch and sex, fairly high concomitance was found at the deciduous second molars (age 5 years) and at the permanent first molars (age 9 years). The r's are between 0.8 and 0.9.

Size and Growth Rate Relations.—The research that will be reviewed under this subhead bears upon the following question: To what extent is the size of the child at a given age related to his subsequent growth? Table VI presents correlation findings on boys from a 1958 study.[33] It will be seen that coefficients representing each of eleven dimensions are listed for size at the age of 5 years with millimeter increment between the ages of 5 and 11 years, and for size at the age of 5 years with percentage increase between the ages of 5 and 11 years. With particular reference to the six dimensions of the head and face, observe that (1) the associations between size and millimeter increase are close to zero and (2) the associations between size and percentage increment are zero or low negative.

TABLE VI. RELATIONSHIPS BETWEEN SIZE AT 5 YEARS OF AGE AND CHANGE DURING THE CHILDHOOD PERIOD FROM 5 TO 11 YEARS

MEASUREMENT	N*	r FOR SIZE AND MILLIMETER GAIN	r FOR SIZE AND PERCENTAGE GAIN
Head length	100	-0.09	-0.28
Head width	100	0.05	-0.13
Upper face width	100	0.09	-0.27
Lower face width	57	0.17	-0.18
Face depth	57	0.13	0.02
Nose height	57	-0.03	-0.35
Height	100	0.42	-0.07
Shoulder width	100	0.13	-0.23
Hip width	100	0.23	-0.03
Arm girth	100	0.41	0.24
Leg girth	100	0.35	0.11

*Data amassed from 1940 to 1957 on white boys residing in Iowa.[33]

Similar findings were obtained in studies on the width of the dental arches at the deciduous canines[8] and at the deciduous second molars.[28] Both studies correlated dental arch width at the age of 4 years with change in dental arch width between the ages of 4 and 8 years; neither obtained any significant relationship (the r's are consistently near zero). Generalizing, it appears that the size of a child at the age of 4 or 5 years gives no clinically useful information regarding the rate at which he will grow during the ensuing years of childhood.

Growth Rate Interrelations.—The association between increases during a given age period in different dimensions of the head, face, and dental arches has been investigated in three recent studies.[8, 28, 36] Two of these studies dealt with the period from 4 to 8 years of age and with relationships between changes in the maxillary and mandibular dental arches. They reported r's (1) near 0.7 from correlating change in arch width at the maxillary deciduous second molars with change at the mandibular deciduous second molars and (2) between 0.5 and 0.6 from correlating change in arch width at the maxillary deciduous canines with change at the mandibular deciduous canines. The third study

encompassed the period between 5 and 11 years of age, securing r's of 0.4 to 0.5 for gain in upper face width with gain in lower face width, and 0.2 to 0.3 for gain in lower face width with gain in head width.

These findings indicate a low positive association between childhood velocities in head width and lower face width, a fairly low positive association between childhood velocities in upper and lower face widths, and a moderate positive association between velocities in corresponding maxillary and mandibular dental arch widths.

FRAMES OF REFERENCE FOR CLINICAL USE

In 1956 Hixon[6] discussed a norm concept suitable for application in contemporary orthodontic practice. This concept rejected "the average as a treatment goal" and recognized the normality of "wide variation in facial structures." It was shown how frames of reference that represent biologic variation can aid the orthodontist in diagnosis and treatment planning.

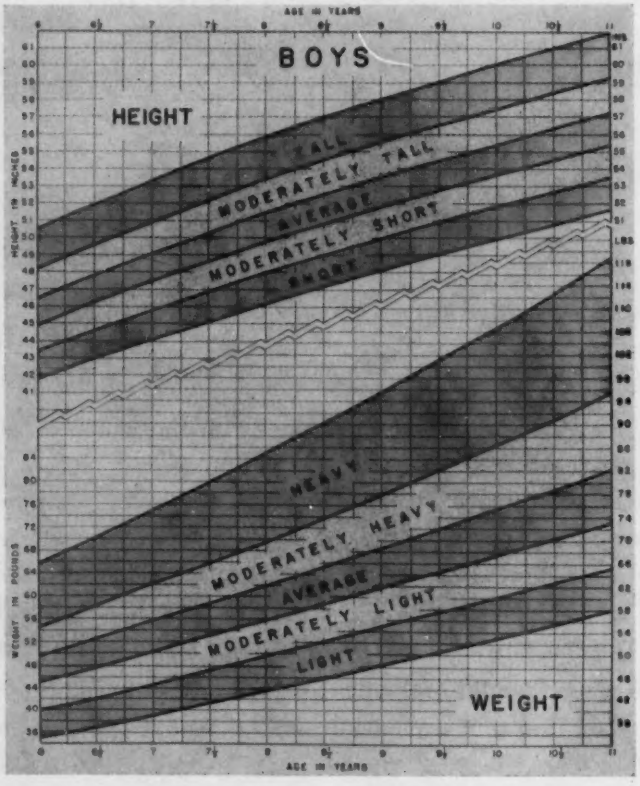

Fig. 8.—Frames of reference for height and weight.

Norms for Body Size and Form.—Frames of reference portraying biologic variation may be constructed either as graphs or as tables. Graphic frames for height and weight are illustrated in Fig. 8. Graphs of this type, extending from early childhood to early adulthood, are available for both sexes through the

American Medical Association and the National Education Association.[17] Supplied with each graph are detailed instructions on (1) measuring height and weight, (2) using the graph to record a person's status and register his progress, and (3) interpreting the graph in ways that helpfully describe the person and render service in his appraisal.

The graphs for height were developed by accumulating height data on North American white children; subgrouping the data with respect to sex and age; tabulating height distributions for homogeneous age-sex subgroups; determining the tenth, thirtieth, seventieth, and ninetieth percentiles of the different distributions; and employing these percentiles to partition each height distribution in five sections. A similar procedure was followed in obtaining the fivefold graphs for weight.

It follows that a North American white boy whose height measurement falls in the "tall" section of Fig. 8 is among the tallest 10 per cent of boys his age, and a boy whose weight measurement falls in the "light" section of Fig. 8 is among the lightest 10 per cent of boys his age. Furthermore, a boy's record lying in the "average" section of the height graph shown in Fig. 8 indicates that in height this boy is among the middle 40 per cent of children of his age and sex. Similarly, a girl's record found to lie in the "average" section of the weight graph available for girls would register that in weight this girl is among the middle 40 per cent of children of her age and sex.

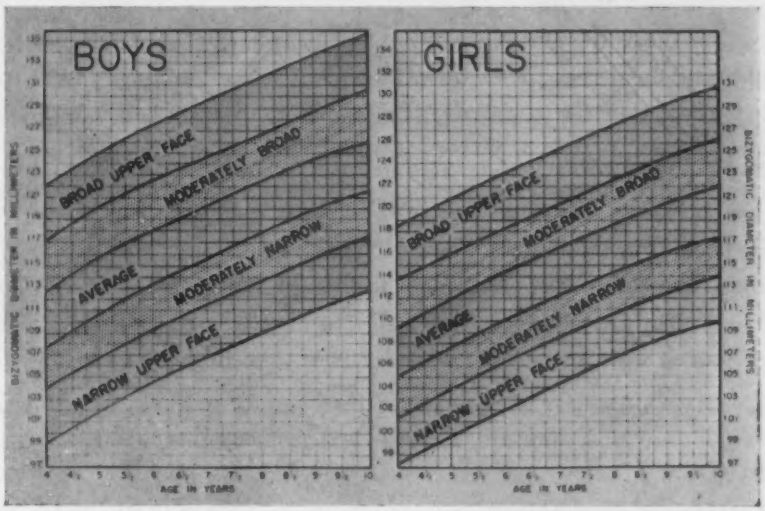

Fig. 9.—Frames of reference for upper face width.

In recent years, several frames of reference developed in the manner described here have been published as tables. These include body size norms,[18, 32, 35] body increment norms,[22, 31] and body form norms[26, 32, 34, 43] for more than a dozen different measures.

Norms for Size and Form of the Face and Dental Arches.—Graphic frames of reference are presented in Fig. 9 for maximum width of the upper face[21] and

in Fig. 10 for maximum width of the dental arches between the deciduous canines.[8] In each instance, the method of construction was the same as that specified for height. Companion frames of reference, in table form, have been reported for nasal height,[24] nasal height in percentage of subnasal height,[29] minimum and maximum width between the maxillary and mandibular permanent first molars,[25] and maximum width between the maxillary and mandibular deciduous second molars.[28]

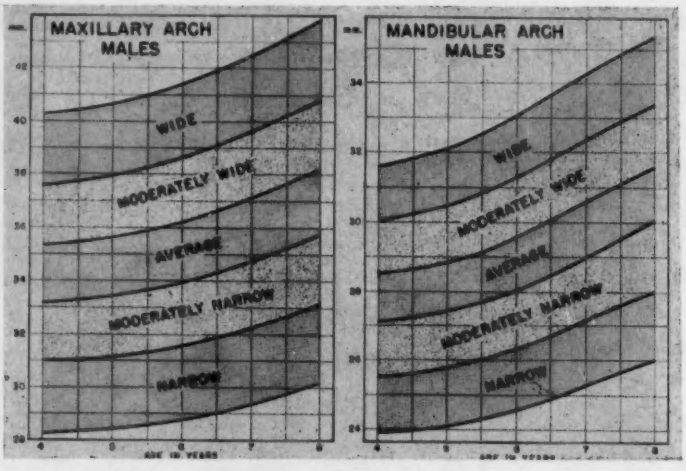

Fig. 10.—Frames of reference for maximum width between the deciduous canine teeth.

There is need to develop additional norms, particularly for other faciodental dimensions and measures of facial and body form. As these are supplied, it is anticipated that there will be a progressive manifestation of the clinical advantages of assessing individual status and progress with their aid.

SUMMARY

Through materials drawn mainly from one research program, it has been shown that during the last decade (1) knowledge on bodily and facial growth in childhood has increased substantially, and (2) progress has been made in utilizing research data to derive clinically useful reference charts.

Special acknowledgments are made to Dr. L. Bodine Higley, co-director of the Facial Growth Study, 1946-1954, and Dr. Ernest H. Hixon, co-director of the Facial Growth Study since 1954.

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POSTERIOR MOVEMENT OF BUCCAL SEGMENTS

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THERE are two types of orthodontist: the college-trained men with limited clinical experience and extensive theoretical training and the preceptor-trained men who have acquired an abundance of clinical experience under the supervision of a skilled clinician. Today the best training should be college training followed by an association with an established orthodontist. My training consisted of a fifteen-year association with Dr. M. J. Buckley plus many short courses and attendance at numerous orthodontic meetings.

William Humphrey, this year's president of the American Board of Orthodontics, has said on many occasions that clinically we achieve results that the research men have tried to tell us are not in the cards.

The following is the lead paragraph in an article from the July 21, 1958, issue of *Newsweek:*

> "I'm a pliers and screw driver man, not a theory man," said Charles F. Kettering, the fabulous boss of General Motors' research department. "I remember the textbook had a theory about how the diesel engine should work. We built a diesel engine that did work, but not the way the book said. According to the book theory, our diesels still don't work."

When I received the invitation to present a case report, I wrote back saying that I could not spend fifteen minutes talking about one case and suggested that I could show a series of cases treated without extraction of permanent teeth. Your program chairman agreed that this would be a timely subject.

I regard most, but not all, malocclusions as being *anterior* displacements. Therefore, treatment should be planned to move the buccal segments posteriorly. If this can be accomplished, extractions should not be necessary. I do not want to create the impression that I do not extract, for I prefer extraction whenever it will simplify treatment and reduce operating time.

An analysis of teeth extracted in 200 consecutive cases from my practice is shown in Table I.

My prime objective in treatment planning is to position teeth in such a way that the denture will have the longest possible life. This precludes the extraction of four sound teeth whenever esthetics can be made acceptable to the patient and the operator. Stability of teeth can be achieved by placing

Read before the Central Section of the American Association of Orthodontists, Cedar Rapids, Iowa, Sept. 29, 1958.

TABLE I. ANALYSIS OF 200 CONSECUTIVE CASES

	NO. OF TEETH EXTRACTED				REGAINED SPACE OF CONGENITALLY MISSING LATERAL INCISORS	MULTILATED*
	4	3	2	1		
No. of cases	6	1	12	10	3	13

Of the 200 cases, 155 were nonextraction cases.

*Mutilated cases were those in which patients presented with one or more permanent teeth missing, usually lower first molars.

them in balanced articulation and in harmony with the musculature. The relationship of teeth to basal bone is of secondary importance. Deep overbites will induce the tendency toward periodontal troubles in the future. A majority of cases in which four premolars are extracted wind up with deep overbites.

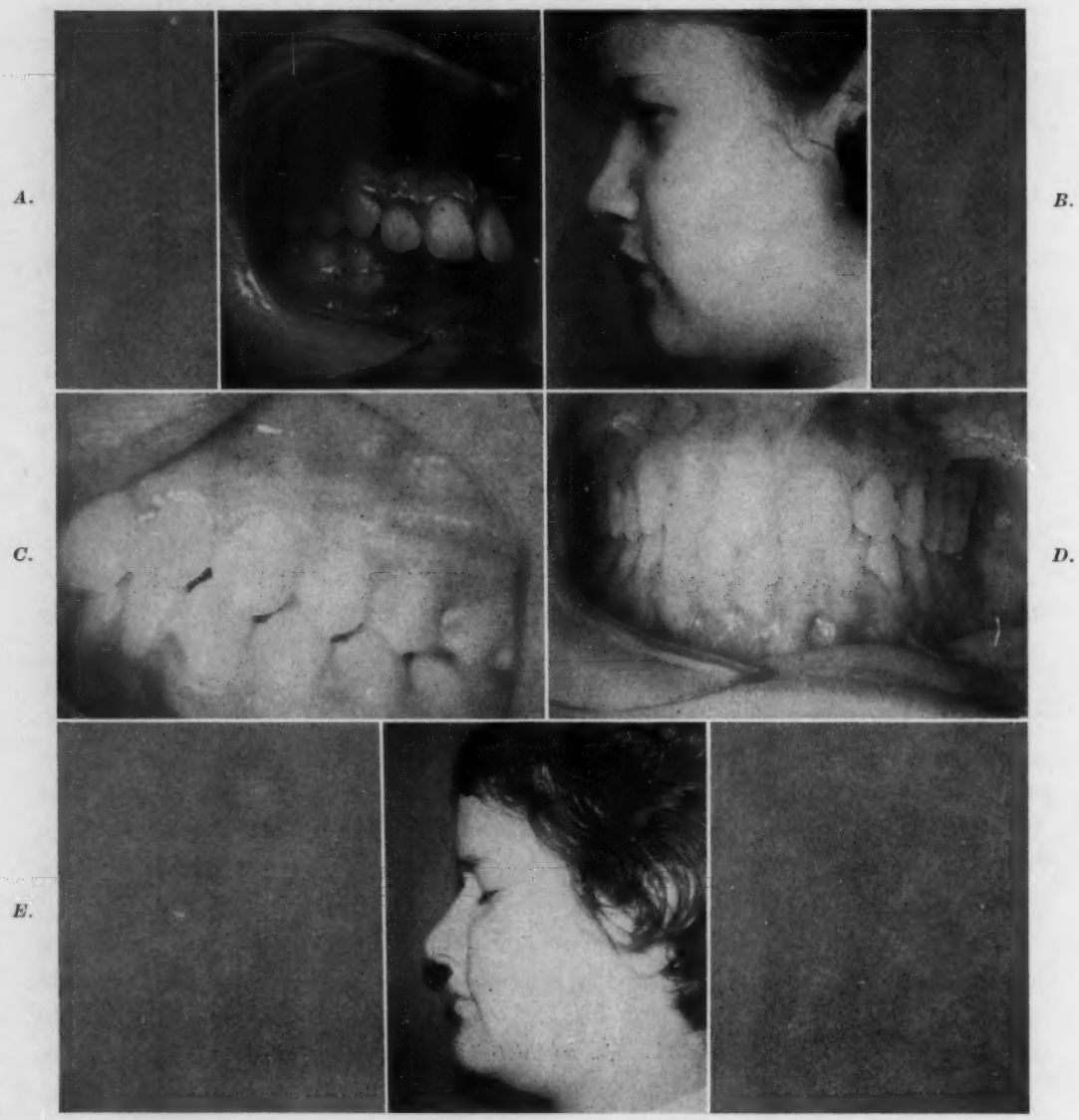

Fig. 1.—*A* and *B*, Before treatment. *C*, *D*, and *E*, After treatment.

In treating patients who present with a full complement of teeth, it should not be necessary to remove four premolars in more than 5 per cent of the cases. Trying to recreate human faces in our own images is not a good orthodontic objective. Many patients prefer to look like their ancestors.

In treating Class II cases, the best treatment is to use for anchorage teeth that have not been moved, and, with the simplest mechanics, to move teeth that need to be moved. The most stable anchorage unit in my hands is a soldered 0.040 inch lingual arch adjusted so that it touches the lowest area of enamel on the four incisors (Fig. 2). This arch should be supported by bands on the first premolars with occlusal spurs to hold the arch gingivally. The arch should be passive and should be allowed to rest for two weeks after cementation before it is used for intermaxillary anchorage.

Fig. 2.—The ideal mandibular anchorage unit. The posterior extensions of the lower lingual arch are used as hooks to move the lower first premolars to proper mesiodistal relationship after the molars have been positioned properly with the buccal bars.

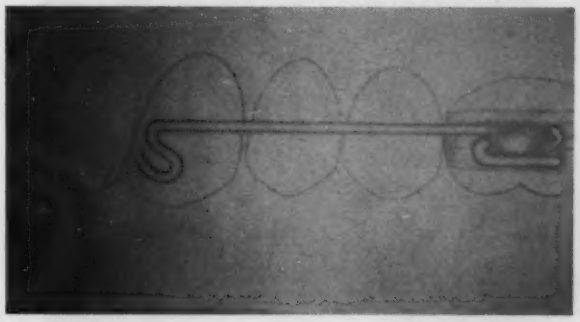

Fig. 3.—Atkinson buccal bar. (From the brochure of the Pacific Northwest Orthodontic Study Club, 1955.)

The ideal appliance for moving molars posteriorly is the Atkinson buccal bar. When it is used with the minimum amount of elastic force, 2 ounces measured with a Richmond or a postal scale, this appliance will move the buccal segments posteriorly, whether second molars are present or not (Fig. 3). Note the mechanics of the buccal bar; the long lever action puts great force on the upper molar with very little force on the anchorage unit.

It is very unfortunate that such a large segment of practicing orthodontists have been taught that molars cannot be moved posteriorly. This is a mental block which some operators have, and one which they should discard.

Fig. 4.—Note that the sliding rod is telescoped over the 0.030 inch arch so that the elastic pressure is on the upper first molar only.

Fig. 5.

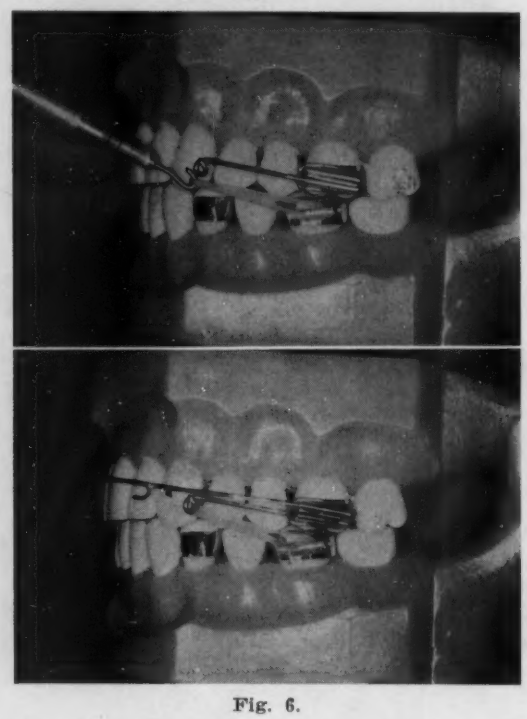

Fig. 6.

Fig. 5.—Use of Richmond gauge to test elastic pressure two or two and one-half ounces of pressure will move the maxillary buccal segments posteriorly.

Fig. 6.—Note double buccal tube—one for the buccal bar and the second for the labial arch. The hooks distal to the lateral incisors are used for cervical anchorage to position the anterior segment.

Some of our finest clinicians state that posterior movement of molars is an illusion and therefore the only solution is extraction. Before the advent of the ribbon and edgewise arch mechanisms, we moved the upper first molars

posteriorly with an 0.045 inch Angle E arch pitted against all the lower teeth ligated to an 0.045 inch lower arch. The nuts on the upper arch were turned up so that the pressure of the elastics was on the molars only. There are other ways that molars can be moved posteriorly (Fig. 4). I used the sliding rod telescoped over the round labial arch for twenty years and discarded it for the much more effective buccal bar. It is important to overdo this posterior movement of the first molars to allow for some springback. In moving maxillary teeth posteriorly, we do not try to expand the arches. Our aim is to move the teeth within the cancellous channel between the buccal and lingual plates of bone. I have modified the Atkinson buccal bar so that it may be used with round tubes as part of the labiolingual or twin arch technique (Figs. 5 and 6).

The upper first premolars are banded with lingual hooks to be used to carry them posteriorly by intramaxillary ligature force or intermaxillary elastic force to the posterior end of the lower lingual arch.

An 0.030 inch labial arch is placed with hooks for cervical tube force to get the maxillary anterior teeth in proper position.

The last step in the active movement of teeth is the alignment of the lower incisors. I prefer to do this with Universal brackets and an 0.010 inch stainless steel twin arch. Any rotations that are necessary are part of this last step. Universal brackets are ideal for the control and management of lower incisors, since they can be used for active treatment and retention.

Some will challenge the above technique, claiming that it might cause maxillary third molar impactions. The incidence of impactions in my patients is not any higher than will be found in a sample of nonorthodontic patients.

On an average, three cases out of each 100 will have relapsing tendency in one of the buccal segments. This is corrected by removal of the second molar. Ultimately, the first molar will settle down into proper interdigitation with the lower first molar and the third molar will erupt in the position of the second molar. Notice that I extract second molars only when there is a relapsing tendency in one of the buccal segments.

I am willing to concede that extraction of four premolars in some cases will produce better lip position for the adolescent child, but a full complement of teeth will endow our patients with healthier dentitions and better facial features for the third, fourth, and fifth decades of life.

SUMMARY

A technique for the posterior movement of maxillary teeth has been presented.

The Atkinson buccal bar will move molars and premolars posteriorly with minimum strain on the mandibular anchorage unit.

The anterior teeth are positioned, using cervical anchorage.

The mechanics are such that noncooperation by the patient will not produce unwanted movement of teeth, as sometimes happens with other techniques.

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PROBLEMS OF ORTHODONTISTS IN TREATING ADOLESCENTS

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INTRODUCTION

THE purpose of this article is to discuss the problems of adolescent adjustment as they relate to orthodontic treatment. Knowledge and application of orthodontic treatment techniques are, of course, imperative to every practitioner. In certain cases, however, the best application of diagnostic and technical procedures can be made relatively ineffective by the patient if the orthodontist does not have a concomitant working knowledge of adolescent psychology.

Adolescents are in a constant state of transition. Therefore, in our association with them we must be constantly aware of their problems. The orthodontist who is cognizant of the psychodynamic aspects of adolescent development and who applies his knowledge of them to the problems which individual patients present has achieved a valuable method of reinforcing his therapy.

In gathering material for this article, I have referred to a number of books on psychiatry, sociology, and psychology. Concepts obtained from them have been correlated and applied to specific problems which have arisen in my dealings with patients.

I wish to express appreciation to Dr. Marc H. Hollender, associate professor of psychiatry and chief of the outpatient service of the Department of Psychiatry, University of Illinois Neuropsychiatric Institute, for his assistance in reviewing this article and approving the manner in which psychiatric concepts have been applied to the handling of problem cases.

DEFINITION AND GENERAL PROBLEMS OF ADOLESCENCE

Adolescence has been defined as "the period extending from the time of puberty to the attainment of complete maturity."[6] With individual variations, it begins at about the ages of 10 in girls and 12 in boys. It encompasses an extensive period of physical and psychological growth. The onset can be determined by observation of physical changes. Modifications of the psychological structure take place at approximately the same time as the physical changes, but these are not as easily determined as the physical changes since they take place more gradually and since no accurate measuring techniques exist for determining changes in psychological growth patterns. Adolescence terminates

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physically, at about the age of 20, with the establishment of the mature body structure and the mature functioning of the glands of internal secretion, particularly those directly related to the reproductive system. It terminates psychologically with the establishment of relatively consistent patterns for dealing with internal conflicts and the demands of reality experienced by the physically mature person.[10]

Adolescence is a period of stress and strain for the maturing person. It involves complex changes in body structure and functions and accompanying changes in emotional maturation and mental expansion. There is an increase in self-consciousness, together with continuous experimentation in social adjustment.[1] Heterosexual interests are developed, and there is a striving toward emancipation from parental controls.[3] Assimilation of these changes by the adolescent into adulthood is dynamic and difficult, and the process has familiar manifestations.

This is pre-eminently a period of social development and adjustment. With the oncoming of adolescence, the boy or girl becomes acutely aware of social pressures and relationships. There is no time during which the awareness of the opinions and attitudes of other persons is so keen. This sensitivity leads the adolescent into the abject conformity characteristic of the period. Any deviation in dress or manner from the mode of the group is actually painful. The boy or girl must have the same kind of clothes, must use the same slang expressions, must do the same things in the same way, and must enjoy the same forms of amusement as his friends, or there is great emotional strain.[2]

Recognizing the strength of the adolescent's social drives, one can understand the effect that orthodontic appliances may have on the patient in this trying period. It becomes apparent why so many adolescents balk at, and are threatened by, the thought of "wearing braces." They naturally abhor any accouterment which may make them appear at a disadvantage socially. As a result of the application of an orthodontic appliance, their appearance, which so vitally affects their social standing with their group, is altered. They are no longer fashionable. They are set apart from the group to which they are trying so desperately to belong. Their conflict and instability, therefore, may be greatly accentuated.

Furthermore, the adolescent may associate the wearing of an appliance with being a child; hence, it represents regression, which is frustrating to a young person who is attempting to establish himself as an adult.

The development of heterosexual contacts is also an important phase of the normal adolescent's life. At this stage boys and girls may feel that the orthodontic appliance certainly does not contribute to their attractiveness to the opposite sex.

These are some of the problems which beset the adolescent and which, in turn, are reflected as problems in our work since they may be manifested in treatment by broken appliances, failure to keep appointments, and lack of cooperation in wearing the appliance as directed. The way in which we may help to ameliorate these difficulties will be discussed.

PROBLEMS ARISING IN CONSULTATION

Resistance to Treatment.—Let us consider the application of some of the foregoing concepts to situations which arise in practice.

Ruth S., aged 13 years, came to my office for consultation, accompanied by her mother. Examination indicated a Class II, Division 2 malocclusion. After taking models and roentgenograms, I suggested that they return on another day, at which time my recommendations would be discussed. Ruth was quiet and withdrawn throughout our initial contact and spoke only in response to direct questions.

When they appeared for their second appointment, I stated that orthodontic treatment was indicated. At this point, Ruth burst into tears. Her mother reprimanded her for "acting like a baby" and expressed indignation that Ruth did not appreciate her parents' good intentions in wanting her to have treatment. Ruth said nothing but continued to sob.

The patient's reaction to her mother was the first problem to be handled. Adolescents are attempting to establish themselves as adults. Their reactions should be treated with respect—not with teasing or ridicule. They should be allowed, in so far as possible, to make their own decisions.[4] Mrs. S.'s depreciation of Ruth in my presence served only to increase the girl's aversion to treatment. It was therefore suggested that Mrs. S. wait in the reception room while I talked alone with Ruth.

I remarked that she seemed to have a lot of feeling about undergoing treatment. I generalized that many patients felt the same way and wondered whether she would like to talk about it. She shook her head and continued to cry.

I noted that Ruth was a very tall, awkward, painfully thin girl, whose face was covered with acne. In evaluating her reaction to treatment in relation to her appearance, the following concepts seemed applicable:

A child has the most difficulty in adapting to physical changes during the period of most rapid growth. Therefore, this probably was a time of heightened sensitivity for Ruth.[9] Rapid growth made her much taller than the average for her chronological age group. Therefore, she was too big to be accepted by a group her own age and probably not yet sufficiently mature to be accepted by the next age group.[11] The girl who is much taller than average may suffer keenly and develop feelings amounting almost to despair about her excessive height. Children do not like differences. The girl who varies noticeably from the group with which she is associated is likely to find herself on the outside, rejected and isolated.[4] The more insecure an adolescent girl is in attempting to establish herself with her peers, the more abjectly she feels that she must conform in appearance and other respects to the rest of the group.[11] Hence, the thought of wearing an appliance was particularly threatening to Ruth.

During adolescence, what a girl is told is best for her takes precedence over what she is now beginning to believe are her own needs and over her first awkward efforts to resolve her own conflicts.[5] Apparently, Ruth was in my office in response to parental pressure and not because she wanted treatment. Since she appeared upset and inarticulate at this time, I suggested that she think over the matter of starting treatment and that we discuss it at another time.

In subsequent interviews I showed Ruth before- and after-treatment photographs of similar cases and discussed treatment objectives with her. In a short time she was able to bring out her negative feelings about having treatment. I accepted these but supported her in the objective of accepting the temporary frustration of wearing an appliance for the long-term gain which would result.

I recognize that our time is limited and valuable. Although several appointments were devoted to discussion rather than to mechanical treatment, I felt that the time was spent constructively, since it is likely that Ruth's initial antipathy would have constituted a material impediment to a successful end result.

PROBLEMS ARISING IN TREATMENT

Reactions to Retarded Growth.—Problems with adolescents arise not only in consultation but also in the course of treatment, as the following case illustrates.

Norman, aged 15, during initial contacts was cooperative and expressed eagerness for treatment, confiding that he had been the target for much ridicule because of his "buck teeth."

Several months after treatment had been initiated, Norman failed to keep his appointments and consistently appeared at unscheduled times. When the necessity for being prompt was discussed with him, he became hostile and rude and loudly demanded immediate attention.

Norman was very slight in build—smaller even than his younger brother, which made his retarded maturation even more difficult for him to bear. Most of the time Norman was gentle and well mannered, but occasionally he had violent outbursts of insolence and rebellion. They were seemingly senseless, uncontrolled outbreaks unless understood in terms of his feeling of frustration. He was desperately afraid that he would not grow—that he might not mature. Cole[2] points out that the failure to mature physically at a rate comparable to other children of the same age group results in real emotional problems for the physically retarded child.

Acquiring insight into Norman's problems helped me to be tolerant toward his attempts to "dictate" to adults. However, I maintained a firm stand about not taking him at unscheduled times. After making a number of futile trips to the office, he began to come at his appointed time.

Exaggerated Sensitivity to Pain—Another problem encountered is that of the patient who complains that the appliance is causing excruciating pain. Careful examination indicates that the pressure exerted by the appliance is not excessive, that the edges of the brace are smooth, and that no loose wires extend to irritate the cheek or lip areas. Lack of inflammation of any part of the mouth is further evidence that no external irritation has occurred. Nevertheless, the patient continues to complain and winces each time his mouth is approached. There are several possible explanations for this exaggerated sensitivity to pain.

The mechanism of displacement may account for some of these complaints. The anxiety about physical sensation becomes the symbolic representation of the basic anxiety concerning the adolescent's adjustment. He feels uneasy and attempts to make the uneasiness tangible by relating it to his physical well-being. Physical concerns are easier to face, easier to expose to others, and easier to find reassurance for than are the ill-defined, nebulous, psychological sources of anxiety.[10]

We cannot ignore the adolescent's complaint about pain, however, for he actually feels discomfort. True hypochondriacal symtoms frequently develop during adolescence. The basic cause differs among individuals. In certain instances the physical discomforts experienced are identical with sensations that formerly have been present, but now the boy or girl reacts to them with greater sensitivity and awareness than previously. The reaction seems to be similar to a characteristic of infancy. That is, the neurosensory system in infancy is especially reactive to physical sensation. During early childhood, boys and girls

develop a mechanism for ignoring mild physical discomfort. In adolescence the sensitive awareness of body sensation returns. Thus, many hypochondriacal symtoms in adolescence may be responses to previously ignored stimuli.[10]

Another possible explanation is that during periods of rapid growth the child has greater needs for specific foods. Some of the pain about which patients complain may represent a subclinical malnutrition.[10]

It has been found best, in treating hypersensitive adolescents, to reduce the extent of the forces exerted by the appliance as much as possible and to take a sympathetic, but not oversolicitous, attitude toward their expressions of pain. A calm, objective, rational approach is effective. We should recognize that it hurts now, but point out that they will have all the years ahead in which to enjoy teeth that are attractive and in good occlusion because of the temporary discomfort that they are now experiencing. In situations in which it becomes too difficult to work with a patient because of consistent complaints of pain, however, examination by a physician might be suggested to ascertain whether there is a nutritional problem, correction of which might alleviate the pain.

Adolescent Rebellion.—We all have had the experience of initiating treatment on a child who is in *early* adolescence. For several months he gives the impression of being a fairly stable person who participates well in a cooperative working relationship. Suddenly a complete metamorphosis takes place. He is irresponsible and noncompliant. He constantly comes late or fails to keep appointments and consistently breaks or loses appliances. When we discuss with him the necessity for being more cooperative, his response is hostile and defiant. During one visit he rejects having orthodontic treatment. During the next visit, however, he humbly asserts that he wants to continue and vows that he will reform. He becomes very dependent and asks for repeated demonstrations on how to carry out instructions. We alternately are exasperated and mystified by his conduct. A review of psychiatric literature provides insight into this enigmatic behavior.

Emotional growth is a continuing process up to adulthood, but there are periods in which the rate of growth is slow and others in which it is more rapid.[2] The so-called latency (early adolescent) phase of psychological development is one of slow but significant change. During the latency period the child is gradually mastering his reality. This is possible because he has discovered ways of dealing with his impulses and conflicts that are compatible with the demands of reality and of his conscience. Therefore, during this period the average child gives the impression of being comfortable in his environment. He approaches his social group with confidence; he protests against unpleasant experiences with very little anxiety; he is reasonable, reliable, and capable of handling responsiblility. However, there is a breakdown of adaptation and the peaceful state described is of short duration. The transition from this early period of adolescence to the next is anything but smooth. It is easier to correlate this change with the growth pattern of girls than of boys because of the distinct temporal delineation that menstruation offers.

Josselyn[10] points out that before the onset of menstruation, and the corresponding developmental changes in boys, the sexual glands are beginning to function. The effectiveness of the secretion of these glands not only has a bearing on physical development and functioning of the body, but it also has a direct effect on the psychological response of the child. There are waves of new feeling accompanied by intensification of old ones. Clinical observations indicate that these changes occur not gradually but with the intensity of breakers that overwhelm the child. The average adolescent goes through a period of fairly short duration in which he seems to have lost a good part of his capacity to deal with reality. His emotional state borders on panic. In the comparatively normal child this period is not too striking. He appears somewhat anxious; he may have difficulty in concentrating and may be extremely restless; he may appear basically confused—a confusion partially disguised by a veneer of ego adaptation. Study of adolescent groups suggests that practically every child is somewhat overwhelmed for a short period by the effects of the physiologic maturation process. His defenses are inadequate to deal with the strain to which he is exposed. The process of reorganizing the defenses probably begins after the glands of internal secretion have established a new interacting balance. The reproductive glands continue to grow for some time, with the resultant increase in hormonal secretion. This change, however, is one of increase rather than change of function. When relative physical stability has been attained, the adolescent has an opportunity to reestablish defenses against forces that are no longer as shifting as they were during the immediately preceding period. Once relative physiologic stability occurs, the psychological structure can be built on a firmer foundation.

The biologic change which manifests itself so clearly in the modification of the body structure is accompanied by an increased urgency for maturation and a concomitant increase in aggressive energy with which to strike out more effectively against controlling forces that strive to prevent gratification of impulses. While a child is freeing himself from identification with his parents, if the struggle seems too great *he may resist all adult authority.*[8] It is well to bear in mind that sporadic attempts at resistance to authority are often followed by acceptance which, in turn, may be followed by more violent resistance. The pattern of behavior is not predictable, and it must be remembered that the resistance to authority displayed by adolescents is not to be taken personally.

If we can be aware of the onset of this period of resistance, the manifestations of which are obvious and marked, we can deal with it by relaxing some of our demands upon cooperation. This is no time to be rigid or insistent. There is a definite distinction, however, between rigidity about trivia and firmness about essentials. Because of the adolescent's basic confusion, he is reassured by having a stable, consistent milieu.[11] We should keep careful records, to which we may refer, as to what instructions have been given regarding the aspects of treatment for which patients are responsible. We should be patient about reinterpreting, where necessary, specifically what is

expected of adolescents and why. Rarely is a child out-and-out rebellious and concerned only with unacceptable ways of behaving.[12] Most defiant adolescents are clumsy only in their efforts to become independent and not defiant in matters of real significance.

Some patients show resentment with no sign of open rebellion. They want advice and suggestions and, if not pressed too rigidly to accept, they probably will, of their own accord, modify behavior in terms of counsel given. Interference at this time is especially resented, for it is a way of demonstrating control over the adolescent's affairs. Therefore, calling parents to intercede should be avoided. In so far as possible, we should deal only with the patient. In friendly, personal conference we may try to search out the reason for and the possible solution to lack of cooperation in treatment. If unsuccessful, we again may attempt to help the adolescent patient analyze his problem and encourage him to try again.

While we recognize that generally it is best to deal with patients alone, we must be realistic and acknowledge that there may arise situations in which we cannot assume full responsibility for a child's guidance (for example, when such infringements as failure to wear rubber bands or headcaps, tardiness, broken appointments, and broken appliances become habitual and talks with the patient alone have failed). In such instances, the orthodontist should mention that it would be desirable for the patient to invite his parents to a three-way discussion directed toward reaching a solution. Calling the parent should not be implied as a threat; rather, it should be presented as a constructive approach to the problem. The patient subsequently should be present throughout the discussion, during which we take a realistic view which accepts some conflict on his part about certain aspects of treatment as being normal. He should be encouraged to share his feelings and, through discussion, we should attempt to help him to evolve a point of view which broadens his immediate outlook and enables him to see the problem of orthodontic treatment in perspective.

Summary: As an adolescent strives to be less childish and more adult, his behavior can appear defiant. The more he feels that his maturity is underrated, the more rebellious he will be and the more awkward will be his attempts to prove how grown-up he is. He needs the opportunity to learn by experience both how to manage himself and how rewarding and pleasurable cooperation can be. Young persons respond best to those who show that they trust them and who continue to trust them despite their errors. The adult who chooses to be the policeman and the lawmaker is destined to be constantly busy and harassed. Rules which adults impose exist only to be broken by adolescents unless they have been accepted by them.[11] Patients who thoroughly understand and respect the rules for proper procedure comply with them because they know their meaning and the reasons for their existence.

Impulsive Acts.—Another problem frequently encountered is that of the patient whose treatment is progressing well and is midway toward or almost

at completion when he suddenly becomes very insistent about knowing when treatment will be completed and subsequently sets up a clamor to have his braces removed immediately. With some understanding of adolescent problems, we can be of real help in deterring the patient from taking what is obviously impetuous, foolhardy action.

The adolescent is impulsive in his behavior and confused about his goals. Not only does this disturb the adults who are interested in his adjustment; it also disturbs and frightens him. As a result, he is likely to make demands for dependence which he has not made since he was a small child. While he struggles for independence, he alternately wants advice about what to do and how to do it. The adolescent's verbalizations and his actual behavior are frequently contradictory from day to day. At one time he follows too rigidly an idealized code of behavior. As if by a sudden metamorphosis of character, he then violates—or, more often, *talks* of violating—every acceptable code of behavior. To add to the confusion, but also to introduce a note of optimism, it should be pointed out that the average adolescent rarely acts out the extremes that he so loudly proclaims he wishes to adopt. A universal characteristic of the normal adolescent is that he is always a contradiction. These contradictions are the result of his attempt to find clear-cut answers to internal conflicts and to problems that his world of reality imposes upon him. They are attempts to lock out one part of his conflict in order to fulfill the urges that the contrasting part of the conflict activates.[10]

Gallagher[5] states: "Rash himself, the adolescent is startled by and has little respect for the adult who acts impulsively." We, therefore, can be of help to the patient by refraining from hasty action when he impulsively requests removal of his braces and by taking the attitude that important decisions should be carefully thought over. We should explore with him these things that have happened to influence his thinking between the time when he seemed so eager to have his teeth straightened and the present, when he precipitously wishes to abandon treatment. We should help him at this point to bring out his negative feelings toward treatment and to accept these. We should, however, point out that a compromise effected today in fulfilling a long-term gain will bring more satisfaction in the future than the immediate gratification of his whim to have the braces removed. If he still insists that he wants the appliance removed it is advisable to recommend that he go home and think it over very carefully and suggest that it be discussed again next time. We can point out that before treatment is terminated we want him to be certain that this is really what he wants.

In general, the adolescent should be given the feeling that we respect him and have confidence in his ability to find a valid solution for himself. He should also feel that, whenever possible, we will help him. We should attempt to protect him wisely from impulsive acts but at the same time give him sufficient freedom to facilitate his maturation. If we wish to aid him, we cannot treat him as a child, but it is equally true that we cannot demand that he be an adult.

SUMMARY AND CONCLUSIONS

In any specific age group, adolescents show wide variation with respect to physical development, emotional maturity, social experiences, attitudes toward authority, and ability to take responsibility. Therefore, no general set of suggestions is applicable for handling patients as a group. There exists, rather, a need to understand the problems of adolescent development and to individualize each patient.

Some salient aspects of adolescent psychodynamics have been presented in conjunction with case material, and an approach to patients which I have found effective has been described. Young persons need adults to be curious about them; curiosity breeds knowledge. If we wonder what makes our patients tick and why they skip a beat occasionally, we are bound to understand them better. The adult who deals with adolescents is fortunate if, on occasion, he can be blind and deaf to minor infractions of rules and can take a joke in the spirit given and respond with a better one.

An awareness of the wide variations in the emotional life and social adjustment of the persons with whom we work is important. Some patients, of course will be so well adjusted as not to constitute a problem in treatment. A number of them, however, will lack the background to enable them to make a satisfactory adjustment. Hence, we must be conscious of the problems of the overshy and retiring, the overbold and belligerent, the tense or hypersensitive child and the child who is rejected by his group.

It is important to establish a rapport with adolescents which makes it possible for them to have the freedom that they need and yet assures their acceptance of guidance and restrictions. Early in the course of treatment we should attempt to learn something of each patient as a person, rather than merely to categorize his malocclusion. Patients should be encouraged toward a free verbalization of feeling concerning orthodontics. Negative feelings should be accepted in a sincere manner, for the patient who feels free to verbalize rather than to suppress his dissentient feelings will have less need to act in a negative fashion through noncompliance in treatment.

An understanding of adolescent psychodynamics and an individualized approach to patients should result in a practice which operates more smoothly, with a resultant higher percentage of successfully treated cases.

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25 East Washington St.

REPORT OF DENTAL FINDINGS OF SEVENTH-DAY ADVENTIST STUDENTS AS COMPARED TO COMPARABLE STUDENTS IN OTHER SCHOOLS*

ROBERT A. DOWNS, D.D.S., M.S.P.H., MURIEL M. DUNN, R.D.H., AND ELEANOR L. RICHIE, M.A., DENVER, COLO.

IN NOVEMBER, 1956, a study of the dental effects of five years of fluoridation was conducted in Grand Junction, Colorado. As a part of the study, the dental conditions of the pupils in the various schools of the city were compared in both the public and parochial schools. Parochial schools included schools of the following denominations: Catholic, Lutheran, and Seventh-day Adventist. Only pupils having a history of consuming Grand Junction city water all their lives were included in this study.

The students' dental caries rate was found to be similar for all the Grand Junction schools with the exception of a statistically lower decay rate found in the students attending the Seventh-day Adventist school.

Although the size of the group in the Seventh-day Adventist church school was small, the teeth showed not only a lowered DMF rate (3.01 as compared to rates ranging from 3.75 to 8.09), but also 31 per cent of the children had no tooth defects while children in the other ten schools ranged from 21 per cent to 8 per cent with no dental defects.

In an effort to determine the reason for this lower dental caries rate in this one particular group, we were told by members of the Seventh-day Adventist Church of the health and dietary principles they advocate. These principles included a continuing dental health educational campaign emphasizing the elimination of refined carbohydrates in their diet and the discouragement of snacking between meals. It was thought that this might be a contributing factor to the difference in tooth decay in the Seventh-day Adventist children. Consequently, it was decided to try to determine if this lower dental caries attack rate was true in another area of the state. A dental inspection was conducted in four Denver parochial schools in January of 1958. The schools were all located in south Denver and represented three different religious denominations. Only children who had lived continuously in Denver and had consumed the city water were chosen from the parochial schools.

*Reprinted by permission from the *Bulletin of the American Association of Public Health Dentists*, November, 1958.

The number of children available, after the factor of a similar water supply was eliminated, is as follows: In the Seventh-day Adventist school the numbers examined are:

6,- 7,- and 8-year-olds— 23, which is 29 per cent of the total number examined.
9,- 10,- and 11-year-olds— 27, which is 34 per cent of the total number examined.
12,- 13,- and 14-year-olds—18, which is 23 per cent of the total number examined.
15- and 16-year-olds— 12, which is 15 per cent of the total number examined.

Eighty children was the total number of continuous residents examined in the Seventh-day Adventist School.

In the other parochial schools combined the numbers examined are:

6,- 7,- and 8-year-olds— 146, which is 29 per cent of the total number examined.
9,- 10,- and 11-year-olds— 187, which is 37 per cent of the total number examined.
12,- 13,- and 14-year-olds—126, which is 25 per cent of the total number examined.
15- and 16-year-olds— 53, which is 10 per cent of the total number examined.

The total number of continuous residents examined in this group of parochial children was 531.

TABLE I. COMPARISON OF DENTAL FINDINGS OF SEVENTH-DAY ADVENTIST AND OTHER SCHOOLS JANUARY, 1958

SCHOOL	AGES	NUMBER EXAMINED	PER CENT OF TOTAL NUMBER EXAMINED	PERMANENT TEETH			PRIMARY TEETH	
				DMF TEETH	D AND F TEETH	D AND F SURFACES	D AND F TEETH	D AND F SURFACES
Seventh-day Adventist	6, 7, and 8	23	29	0.83	0.83	0.97	3.04	5.26
	9, 10, and 11	27	34	1.41	1.41	1.81	2.07	3.63
	12, 13, and 14	18	23	2.00	2.00	2.50	—	—
	15 and 16	12	15	4.75	4.75	5.92	—	—
Other schools combined	6, 7, and 8	146	29	0.90	0.90	1.01	3.09	5.32
	9, 10, and 11	187	37	2.47	2.43	3.15	2.72	4.80
	12, 13, and 14	126	25	4.70	4.69	6.13	—	—
	15 and 16	53	10	6.92	6.91	10.09	—	—

The number of continuous residents examined in the Seventh-day Adventist school, in the various age groups, is insufficient to provide the basis of statistically reliable averages. In the combined parochial school group the number of children examined more nearly approaches a reasonable sample.

The observed rates remain interesting as comparisons which again indicate the important relationship between the diet and DMF rates.

The dental caries rates are consistently lower in the Seventh-day Adventist school group than in the other school groups.

We would urge that a similar study be conducted in an area where a larger number of children of Seventh-day Adventist faith are available to confirm these findings.

Reports

REPORT OF THE SPECIAL COMMITTEE ON ROENTGENOGRAPHIC CEPHALOMETRICS, AMERICAN ASSOCIATION OF ORTHODONTISTS

THE American Association of Orthodontists, at its annual meeting in Boston in 1956, voted to hold a Workshop on Roentgenographic Cephalometrics, to be presented by the Special Committee on Roentgenographic Cephalometrics, and that a report on the Workshop be presented to the Association. The Workshop was accordingly held at the Bolton Fund Headquarters, Western Reserve University, Cleveland, Ohio, on March 24, 25, and 26, 1957.

Participants of the Workshop included the following:

Allan G. Brodie
W. M. Krogman
T. D. Graber
H. I. Margolis
Professor Norman L. Hoerr (who succeeded the late T. Wingate Todd at Western Reserve University)
J. A. Salzmann, chairman
L. Bodine Higley
William B. Downs
Robert E. Moyers
B. Holly Broadbent
C. Wesley Dupertuis (a leading physical anthropologist)
William H. Golden (in charge of roentgenology at the Bolton Headquarters)

The purpose of the Workshop is to find common areas of agreement with regard to (1) sites of craniofacial growth; (2) landmarks; (3) points of reference; (4) methods of locating the foregoing; (5) points, planes, and angles of measurement; and (6) minimum requirements for roentgenographic cephalometrics for clinical practice.

A copy of the edited transcript of the Workshop has been mailed to the officers and directors of the American Association of Orthodontists.

The Committee recommends the following:

1. That the Committee explore the possibilities of having the edited transcript published for distribution at cost to the members of the American Association of Orthodontists and to others who may desire it.
2. That a second Workshop on Roentgenographic Cephalometrics be held at the earliest time possible, without financial obligation to the American Association of Orthodontists. Participation should be extended to a larger group, which should include teachers, research workers, and clinicians.

3. That plans for the Workshop should be submitted to the Ad Interim Committee or the Board of Directors of the Association for approval.
4. That an appropriation of $200.00 be provided to defray the expenses of the Committee.

Respectfully submitted,
ALLAN G. BRODIE, SR.
L. BODINE HIGLEY
J. A. SALZMANN, Chairman
W. M. KROGMAN, Consultant

EDITOR'S REPORT, AMERICAN ASSOCIATION OF ORTHODONTISTS, 1958

ACCORDING to the provisions of the Constitution and By-Laws of the A.A.O., the editor of your JOURNAL has presented formal annual reports to your Board from year to year with regard to the operation and direction of the JOURNAL. In addition to that, an annual report is made by the chairman of the Publications Board. The chairman this year is Dr. John Richmond of Kansas City, Kansas, and he expects to read his report before this body.

Each year the editor has picked out some particular phase, aside from the usual routine procedures, that it is thought may be of interest to your Board. Obviously, this year it may be well to report the plan of the publication of Orthodontic Profiles currently being written and published in the JOURNAL.

Various journals devoted to the advancement of the specialties of medicine from time to time *do* publish profiles of outstanding workers who have contributed much to the creation and progress of their specialties. Each profile consists of a brief digest of the man's life and an outline of what he created of value to his specialty and the public. Many of these men have passed on; sometimes, however, profiles are published of the living. In this way, every few months there is created an additional link in the chain of the record of the pioneers of the particular specialty. It has been proved that the profile section of a highly specialized journal has great reader interest and is very popular.

After some discussion with the members of the Editorial Board of the AMERICAN JOURNAL OF ORTHODONTICS, it was thought that a profile section in the JOURNAL would be of great interest to the readers. In the main, those asked to write the profiles would be men who had taken part in the development of orthodontics and knew something of the career of each person presented in this section of the JOURNAL.

In 1956 Bernard Weinberger, the well-known authority on the history of both dentistry and orthodontics, agreed to write the profile of Milo Hellman. Dr. Weinberger gave the task much thought and time and the reader interest proved to be outstanding. The Milo Hellman profile was published in 1956,

Vol. 42, No. 11, p. 858. Other profiles written by various authors have been published since then. There has appeared, or is in preparation, a series consisting of eighteen accounts of the contributions and lives of our pioneers, as follows:

Milo Hellman	by Bernard Weinberger
Albin Oppenheim	by Spencer R. Atkinson
Edward H. Angle	by Fredrick B. Noyes
Calvin S. Case	by Charles R. Baker
Martin Dewey	by Paul G. Spencer
Allan H. Suggett	by James D. McCoy
Norman W. Kingsley	by Joseph D. Eby
Victor Hugo Jackson	by Walter C. Chapin
Marguerite Stadelhofer	by H. C. Pollock, Sr.
George W. Grieve	by G. Vernon Fisk
Simeon H. Guilford	by Andrew F. Jackson
Robert Dunn	by James D. McCoy
Rodriques Ottolingui	by Bernard Weinberger
John Mershon	by Leuman Waugh
Edward H. Wuerpel	by H. C. Pollock, Sr.
Lester Stanton	by Ashley Howes
J. Lowe Young	by Glen Young
A. H. Ketcham	by George Siersma
William Law	by Bernard deVries

The type is being saved on all of the profiles, and The C. V. Mosby Company assures us that subsequent to the publication of the current series they will be published in book form and will be provided to all members of the A.A.O. who may desire them at cost to the publishers.

Your editor has enjoyed the excellent cooperation of all the members of the editorial staff. Some have served at considerable expense in time and effort and without compensation of any kind.

We have been able to do fairly well with our traditional illustration expense this year by virtue of our publisher's having helped out beyond the contractual obligations. I am sure that Chairman Richmond will cover, or has covered, the business report in his presentation.

To sum up, the forty-third year of the life of your JOURNAL is another milestone. Your editor feels that he can say without dispute that your specialty enjoys the richest and most profuse recorded literature of any single department of dentistry, and few departments of medicine are able to match it.

Respectfully submitted,

H. C. POLLOCK, SR., Editor
AMERICAN JOURNAL OF ORTHODONTICS

Department of Orthodontic Abstracts and Reviews

Edited by
DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Abstracts Presented Before the Research Section of the American Association of Orthodontists, New York, May, 1958

Surgical Alteration of Sutural Growth in the Cranium and Face of the Cat: By Carl K. Christian, D.D.S., Eastman Dental Dispensary, Rochester, New York.

This study was designed to determine the effects of mechanical alteration of known sutural growth sites upon the growth of the craniofacial complex of the cat.

Nine 4-week-old cats, separated into groups of three, were utilized for this study. The first cat in each group served as a control for that group. The second and third cats in each group were operated upon. While the cats were sedated, lateral and frontal cephalometric roentgenograms were taken and the dates were recorded. Intraoral impressions were taken of the maxillary and mandibular dental arches.

The second cat in each group had the entire coronal area of the head exposed, including the nasofronto-maxillary suture area. Two sections of bone, each about 1 cm. square, were carefully marked off with calipers. One section included the area of convergence of the frontoparietal sutures; the other was centered in the left parietal bone. These sections were subsequently separated from the cranium and interchanged in position. To complete the procedure, the sutures uniting the maxilla and the nasal and frontal bones were partially obliterated by the use of a large fissure burr. The operative procedure for the third cat in each group consisted of destroying the maxillomalar suture with a large fissure burr.

To facilitate observation of growth increments, Group I was injected at regular intervals with a vital dye, trypan blue. Group II was similarly injected with alizarine red S. Group III was analyzed, using decalcified sections, and is the group reported on at present.

Preliminary histologic observations indicated that a complete sutural stenosis was not induced by the operative procedure, but rather the outlines of the transplanted blocks of bone persisted in the form of incomplete vertical sutures themselves. Visual observations of the casts revealed no intraoral growth aberrations. Histologic and cephalometric evidence seems to indicate that a growth discrepancy may have developed in the cranial area, manifesting itself as a relative excessive anterior-posterior dimension.

The sutures obliterated with a burr recovered their normal morphology and apparently contributed little to the observed cranial irregularity; furthermore, the procedure of interchanging sutural areas with nonsutural areas may have led to a partial developmental stenosis and an aberrant pattern of growth.

Oral Myometric Pressures: Instrumentation and Procedure*: By Robert V. Winders, D.D.S., M.S.D., Marquette University, School of Dentistry, Milwaukee, Wisconsin.

The purpose of this study was to investigate the practicability of constructing an intraoral dynograph capable of recording the pressures exerted on the dentition by the perioral and lingual musculature, employing an inductance principle.

A beat-frequency oscillator recorder was used, and various transducers were constructed and tested. This type of instrument did not prove satisfactory due to changes in capacitance incurred in the lead wires and the necessity of using bulky coaxial cable for this purpose. Capacitance transducers proved impractical for the above reasons also.

Inductance transducers employing primary and secondary coil were also tested proved unsatisfactory due to the restriction of the size of the transducer limiting the size of the coils and consequently the sensitivity.

It was concluded that intraoral dynographs employing reluctance, inductance, or capacitance transducers are not suitable for this type of pressure measurement.

The resistance dynograph, the applicability and reliability of which was established by the author in a previous study, has since been employed. Certain refinements in instrumentation have been accomplished and data for a comprehensive study of intraoral myometric pressures are being collected at the present time.

Present evaluations lead to the following conclusions:

1. Reluctance, inductance, and capacitance recording instruments are not applicable for recording pressures exerted on the dentition by the perioral and lingual musculature.
2. Resistance dynographs are best suited for this type of pressure measurements.

*This investigation was supported by a research grant from the Division of Research Grants and Fellowships of the National Institutes of Health, United States Public Health Service.

News and Notes

American Association of Orthodontists
Registration of Nonmembers for Attendance at Annual Sessions

To ensure full participation of all active members of the American Association of Orthodontists, the following classification of nonmembers eligible to attend and schedule of attendance fees, which will be charged at the time of registration, has been set up for the coming annual session of the Association at the Statler-Hilton Hotel, Detroit, Michigan, May 3 to 7, 1959.

A. *No Attendance Fee.*

1. Full-time teachers in university dental schools.
2. Full-time graduate or postgraduate students in university orthodontic departments. It will be necessary to present a letter from the dean of the school certifying the status of the student.
3. Dentists from outside Canada or the United States of America who are members of recognized dental or orthodontic organizations.

B. *Attendance Fee—$10.00.*

1. Associate or junior members of constituent societies of the American Association of Orthodontists.
2. Recent graduates of university orthodontic departments who are in Government Service.

C. *Attendance Fee—$20.00.*

1. Recent graduates of university orthodontic departments who are not members of constituent societies of the American Association of Orthodontists.
2. Other guests.

Those persons who would be classified under the heading of C-1 or C-2 above are required to apply to the chairman of the Credentials Committee at least sixty days before the session for proper forms, which will require (a) written endorsement by two active members of the A.A.O. in the applicant's vicinity, (b) that the applicant be a member in good standing of the American Dental Association, and (c) that the applicant never has been rejected for membership in any of the constituent societies of the A.A.O.

Those persons who would be classified under the headings of A or B would be required only to submit credentials identifying themselves as being in one of these categories at the time of registration. Advanced reservations, which are by far most desirable, can be applied for by clearing one's credentials with the Credentials Committee by March 1, 1959.

Registration under categories C-1 and C-2 will, of necessity, be limited.

David L. Hall, Chairman
Credentials Committee
660 Cadieux Rd.
Grosse Pointe 30, Michigan

Ladies' Program at 1959 Session of the American Association of Orthodontists, Statler-Hilton Hotel, Detroit, Michigan May 3-7, 1959

Sunday, May 3

10-5 Ladies' Registration.
6 Champagne Reunion.

Monday, May 4

9-11:30 Ladies' Registration.
8:30-10:30 Continental Breakfast. (Tickets necessary.)
12:30 Ladies' Annual Luncheon. The Ladies' Luncheon will feature Betty Roberts in "Far Eastern Horizons," an unusual story and picture trip to Japan. There will be music and table prizes. This luncheon will be at the Sheraton-Cadillac Hotel, within five minutes' walk from the Statler-Hilton Hotel and the Tuller Hotel. (Reservation tickets necessary.)

"Mrs. Roberts is a pioneer woman in radio, having first appeared on radio station WJBK thirty years ago and active for a period of twenty-three years. For years, she was well known for her trips with George Buchanan to Alaska. She has spent fifteen years giving travel lectures and ten years studying symbolism of oriental culture. Her more recent trip to Southeast Asia coupled with her intimate knowledge of Japan promises a delightful program. Mrs. Roberts will appear in an authentic bridal reception kimono."

Tuesday, May 5

9-11:30 Ladies' Registration.
8:30-10:30 Continental Breakfast. (Tickets necessary.)
12:30 Mixed Luncheon. (Reserved tickets necessary. Attendance limited to 600 people, accepted in order reservation requests are received.)
Tours in the afternoon, in small groups of members and guests.

Wednesday, May 6

9 Ladies' Registration.
6:30 President's Reception. (Tickets necessary.)
7:30 Banquet and Dance. (Tickets necessary.) (Dress optional.)

Ladies' Entertainment Committee

C. Roy Brooks — Chairman
Mrs. C. Roy Brooks — Co-Chairman

Executive Committee

Mrs. C. Edward Martinek
Mrs. Robert E. Coleman
Mrs. George Harris
Mrs. J. Hilliard Hicks

Committee

Mrs. Robert Aldrich
Mrs. Carl Anderson
Mrs. George Anderson
Mrs. Ernest Bach
Mrs. Richard Beatty
Mrs. Donald Bergeron
Mrs. Frank Bowyer
Mrs. Frank Cartwright
Mrs. Wm. R. Humphrey
Mrs. Douglas Jamieson
Mrs. Milton Lappin
Mrs. Bernard Lyon
Mrs. Jos. Maher
Mrs. Barnett Malbin
Mrs. D. C. Miller
Mrs. Leon Montague

Mrs. Edward Cheney
Mrs. Wm. Clauss
Mrs. Arthur Craven
Mrs. Marvin Davis
Mrs. B. F. Dewel
Mrs. Bruce Foster
Mrs. Lewis Gach
Mrs. Samuel Glossman
Mrs. Joseph Grant
Mrs. John Henkel
Mrs. L. B. Higley
Mrs. Scott Holmes
Mrs. Stephen Hopkins
Mrs. Robert Moyers
Mrs. Marcus Murphey
Mrs. Harvey Payne
Mrs. Paul Ponitz
Mrs. Wilbur Prezzano
Mrs. Richard Railsback
Mrs. Paul Reid
Mrs. J. A. Salzmann
Mrs. Earl Shepard
Mrs. Donald Shumaker
Mrs. John R. Thompson
Mrs. O. W. White
Mrs. Howard Wilson
Mrs. Wendell L. Wylie

American Association of Orthodontists
Preliminary Program of Fifty-Fifth Annual Session
Statler-Hilton Hotel
Detroit, Michigan
May 3-7, 1959

It is the desire of the Program Committee that the 1959 program of the American Association of Orthodontists be constructive and thought provoking. The basic theme is as old as orthodontics itself, and we hope that its application will be as current as today's news. The theme will be "Diagnosis, Treatment Planning, Appliance Therapy," and it is our hope that each essay and Limited Attendance Clinic will play an important part in the total integrated program.

In order to cover the subject completely and yet concisely, the Committee has reduced the number of essayists to the minimum and will give each man ample time to explore his subject thoroughly. The program will begin with a philosophical analysis of the basic principles of an orthodontic diagnosis. This will be followed by an evaluation of all diagnostic aids to the end that each aid may be assigned its rightful position in the development of an orthodontic diagnosis.

After the groundwork for a proper diagnosis has been laid, then two essayists with divergent concepts of appliance therapy will be asked to give papers on "The Development of a Treatment Plan in the Light of One's Concept of Treatment Objectives." The next stage of the integrated program will be the Limited Attendance Clinics, patterned upon the basic theme of the convention. Each man will be asked to present cases in which he will thoroughly cover preliminary study, the use of diagnostic aids, the formulation of a diagnosis, the development of a treatment plan, and finally the appliance therapy.

Interspersed between the above portions of the basic program will be an American Board thesis, the Prize Essay, the Research Section program, and the Table Clinics. On the final day of the meeting the program will deal with prognosis, and on this day an attempt will be made to prognose orthodontics itself. The theme for the last day will be "Orthodontics in 1969."

The Program Committee sincerely hopes that the 1959 program will be enjoyable, instructive, and conducive to thought. In a subsequent issue of the JOURNAL, the final program will be published.

Scott T. Holmes, Chairman
Carl Anderson, Co-Chairman
Program Committee
American Association of Orthodontists

Program Outline

Monday

9. Welcome.
   Invocation.
   President's Address.
10. THE PHILOSOPHY OF ORTHODONTIC DIAGNOSIS. Wendell L. Wylie.
11:15. Selected American Board Thesis. Robert Moyers.
12. Golden Anniversary Luncheon.
1:45. Ketcham Award—Presentation and Response.
2:30. THE ROLE OF DIAGNOSTIC AIDS IN THE DEVELOPMENT OF A DIAGNOSIS. Alton Moore.
3:45. A.A.O. Prize Essay.

Tuesday

9. THE DEVELOPMENT OF A TREATMENT PLAN IN THE LIGHT OF ONE'S CONCEPT OF TREATMENT OBJECTIVES. Joseph Jarabak.
10:15. THE DEVELOPMENT OF A TREATMENT PLAN IN THE LIGHT OF ONE'S CONCEPT OF TREATMENT OBJECTIVES. William L. Wilson.
11:30. Business Meeting.
1:30. Research Section Program.

Wednesday

Morning. Table Clinics

Afternoon. Limited Attendance Clinics on the subject of DIAGNOSIS—TREATMENT PLANNING —APPLIANCE THERAPY. (Each man will be asked to present cases in which he will thoroughly cover preliminary study, the use of diagnostic aids, the formulation of a diagnosis, the development of a treatment plan, and finally the appliance therapy. Attempts will be made to select men who will use various types of appliance therapy.)

Thursday

9. ORTHODONTICS IN 1969. Tom Graber.
10:15. ORTHODONTICS IN 1969. Harold Hillenbrand.
11:30. Business Meeting.
12. Adjournment.

Limited Attendance Clinics

The Limited Attendance Clinics have been planned to complement the main essay program. Whereas the main essays will deal with broad philosophical considerations and principles concerning diagnosis and treatment planning, the Limited Attendance Lectures will be more specific.

Participants in the Limited Attendance Clinics have been asked to discuss their own methods of diagnosis and treatment and to emphasize the reasoning and thinking which go into the use of them. Each man will present cases in which he will thoroughly cover preliminary study, the use of diagnostic aids, the formulation of a diagnosis, the development of a treatment plan, and finally the appliance therapy.

Eighteen orthodontists have been invited to present Limited Attendance Clinic lectures:

1. Dr. Eugene West, San Francisco, California.
2. Dr. H. L. Shehan, Jackson, Michigan.
3. Dr. William Oliver, Nashville, Tennessee.
4. Dr. Donald A. Closson, Kansas City, Missouri.
5. Dr. W. M. Thompson, Jr., Pittsburgh, Pennsylvania.
6. Dr. James Jay, New York, New York.
7. Dr. H. K. Terry, Miami, Florida.
8. Dr. Paul V. Ponitz, Battle Creek, Michigan.
9. Dr. Russell E. Huber, Dayton, Ohio.
10. Dr. Faustin N. Weber, Memphis, Tennessee.

11. Dr. Paul V. Reid, Philadelphia, Pennsylvania.
12. Dr. William S. Brandhorst, Ladue, Missouri.
13. Dr. R. A. Riedel, Seattle, Washington.
14. Dr. Howard J. Buchner, Oak Park, Illinois.
15. Dr. Merlin A. Spain, Omaha, Nebraska.
16. Dr. H. Halderson, Toronto, Canada.
17. Dr. L. Bodine Higley, Chapel Hill, North Carolina.
18. Dr. Cecil C. Steiner, Beverly Hills, California.

Edward Cheney, Clinic Chairman

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Statler Hotel in Detroit, Michigan, April 28 through May 2, 1959. Orthodontists who desire to be certified by the Board may obtain application blanks from the Secretary, Dr. Wendell L. Wylie, University of California School of Dentistry, The Medical Center, San Francisco 22, California.

Applications for acceptance at the Detroit meeting, leading to stipulation of examination requirements for the following year, must be filed before March 1, 1959. To be eligible, an applicant must have been an *active* member of the American Association of Orthodontists for at least two years.

Great Lakes Society of Orthodontists

The Great Lakes Society of Orthodontists held its twenty-ninth annual meeting at the Neill House in Columbus, Ohio, on Nov. 2, 3, and 4, 1958.

The meeting was to have been held in Pittsburgh, Pennsylvania, the home of the Society's president, Edwin G. Flint. However, because of a strike at all the hotels in Pittsburgh the meeting was transferred to Columbus only two weeks ahead of time. Our Columbus members and their wives pitched right in to make President Flint's meeting an excellent one. We thank them wholeheartedly!

On Sunday evening a general reception was held in the Society's headquarters suite. Everyone attending had a most enjoyable evening.

At the Society breakfast on Monday morning the meeting was officially opened by President Flint. The invocation was pronounced by the Rev. Dr. Otis A. Maxfield of Columbus, Ohio. This was followed by the president's address and the business meeting.

Richard Beatty presided over the Monday morning scientific session. Dr. Beatty introduced Robert M. Ricketts of Pacific Palisades, California, whose presentation was entitled "Current Application of the Cephalometric Procedure." His lecture was copiously illustrated with colored slides, projection of cephalometric plates and tracings, and many sketches.

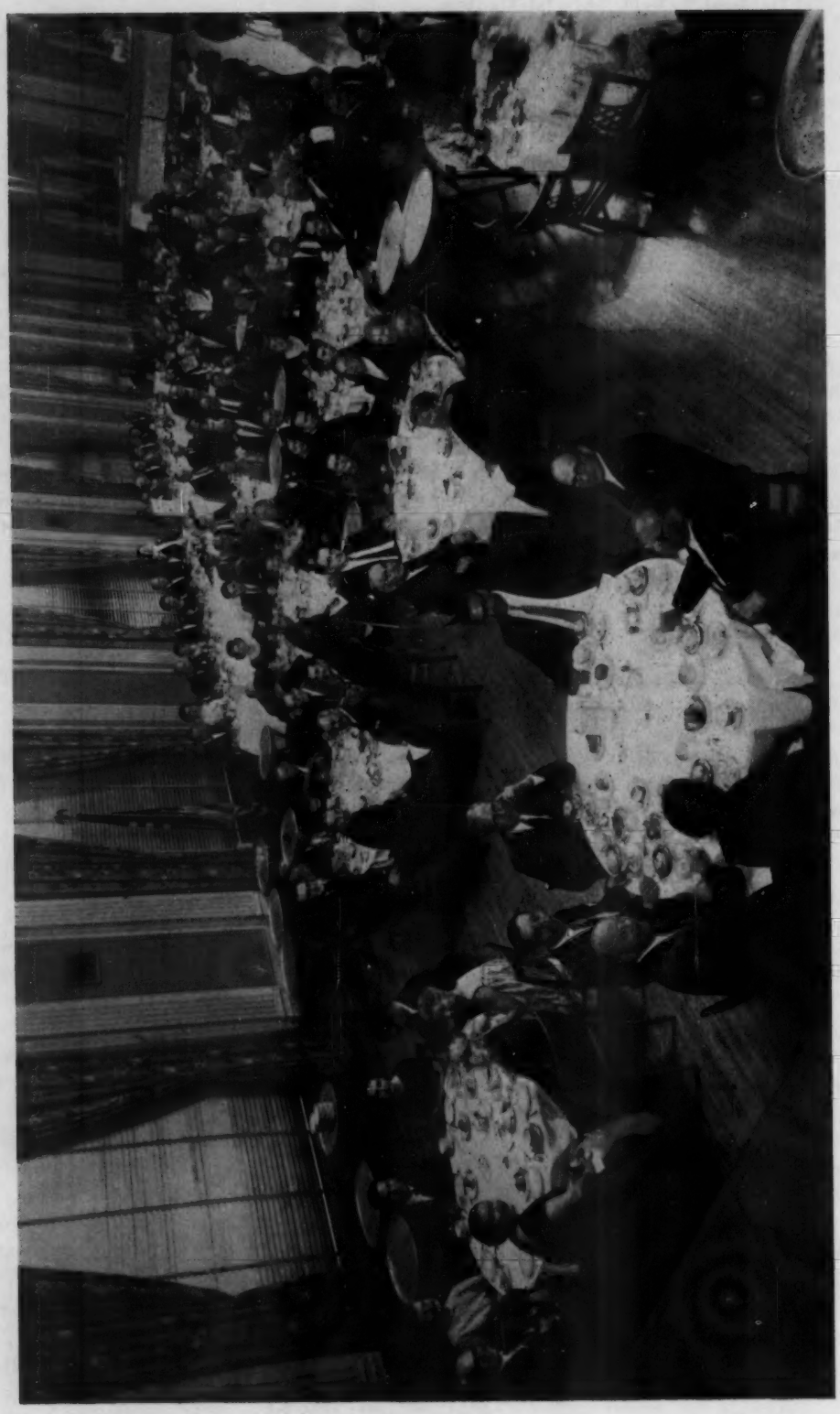
The Past-Presidents' Luncheon was well attended by the nineteen former presidents at the meeting (out of a possible twenty-four). C. Edward Martinek, a past-president, told of his activities as president of the American Association of Orthodontists.

The afternoon session was called to order at 2 P.M. by Vernon Fisk. He introduced Arthur H. Craven of East Lansing, Michigan, whose subject was "Can an Orthodontist Predict Facial Growth?"

The speaker at 3 P.M. was T. L. Dehne, M.D., of Philadelphia, Pennsylvania, who spoke on "A Psychiatric Study of Certain Functions of the Mouth."

The speaker at 4 P.M. was Stephen C. Hopkins, Sr., of Washington, D. C., whose subject was "Aims of an Orthodontic Preceptorship Training Program."

On Monday evening, at the President's Reception, the members and their wives had a grand time chatting with friends whom they had not seen for a year and meeting



Twenty-ninth annual meeting of the Great Lakes Society of Orthodontists, Neill House, Columbus, Ohio, Nov. 2-4, 1958.

new friends. The banquet was excellent, and the day's events were climaxed with outstanding entertainment, especially by one George Bailey whose memory stunt was astounding. His musical glasses were superb in tone quality, and his ability to play them was remarkable.

The Tuesday morning session was called to order at 9 A.M. by Scott Holmes, presiding for Henry Cossitt who was unable to be present on Tuesday. Dr. Holmes introduced Samuel J. Lewis of Kalamazoo, Michigan, whose subject was "Modern Trends in Orthodontic Therapy."

The 10 A.M. speaker was Edward J. Forrest of Chicago, Illinois, whose subject was "Research and the Practicing Orthodontist." He spoke again at 11 A.M. on "Growth, Development, and Environmental Influences in Orthodontic Treatment."

At noon on Tuesday the Society Luncheon, with the ladies, was very delightful. W. M. Krogman, Director of the Institute for Child Study at Philadelphia, Pennsylvania, was the speaker. His presentation was entitled "The Evil is Buried With the Bones."

The afternoon session was called to order at 2 P.M. by Paul V. Ponitz, substituting for Carl Anderson who was ill and could not be present. Dr. Ponitz introduced Robert E. Moyers of Ann Arbor, Michigan, who spoke on "The Orthodontic Workshop of June 16-21, 1958."

Dr. Ponitz next introduced Harold D. Kesling, whose subject was "The Begg Light Wire Technique—Observations and Experiences."

The concluding business session was held at 4 P.M.

Tuesday evening at 7 o'clock the table clinics were presented. There were twenty-three clinics prepared by the following clinicians: James P. Alderisio, Floyd Arnold, William J. Clauss, Frank O. Clifford, Bruce A. Curran, Robert L. Deshong, Joseph R. Jarabak, Samuel J. Lewis, B. W. Lyon, D. C. Miller, Hunter J. Miller, G. Wayne Oglestone, Robert D. Orcutt, Howard W. Peterson, University of Pittsburgh (students), Joseph L. Polk, Robert J. Ponitz, L. W. Robinson, Donald B. Shumaker, Morris M. Stoner, A. K. Toepfer, Robert G. Wicks, and Walter F. Hampe.

There were 131 members present and 165 students, guests, and wives.

The Society extends a hearty thank you to Wilson R. Flint, general chairman; Paul V. Ponitz, program chairman; George S. Harris, table clinic chairman; and Herbert La Rue, commercial exhibits chairman.

Thanks are also extended to all the commercial exhibitors for their support and their promotion of the materials which are essential to the practice of orthodontics.

Our hats are off to Edwin (Ted) Flint, our most recent ex-president, for the superb job he did while in office. He is to be particularly commended for his handling of the emergency situation which arose because of the Pittsburgh hotel strike.

Henry D. Cossitt, Editor

Northeastern Society of Orthodontists

The annual spring meeting of the Northeastern Society of Orthodontists will be held at the Hotel Biltmore in New York City on Monday and Tuesday, March 9 and 10, 1959.

Southern Society of Orthodontists

The thirty-seventh annual meeting of the Southern Society of Orthodontists was held Oct. 19 to 24, 1958, aboard the M. V. Arosa Sky, en route from Norfolk, Virginia, to Bermuda and back. Unfortunately, we had bad weather the first day out, and sea sickness was rather prevalent. There was more than fair attendance to all lectures, however, thanks to the good effects of Dramamine and Bonamine.

Considering the weather, time of year, and conflicting meetings and interests, the attendance, which totaled 170 members, wives, guests, and exhibitors, was very good.

Old timers absent and greatly missed included Drs. Oren Oliver, J. A. Gorman, Thad and Donald Morrison, George B. Crozat, Sam D. Gore, Sr., Tyler Haynes, Harry Shotwell, L. B.

Higley, and A. C. Broussard. Dr. Broussard had a very serious accident some months ago but is reported on the way to good recovery.

A brief résumé of the meeting follows:

Sunday, Oct. 19, 1958

Executive Board meeting.
Cocktail party.

Monday, Oct. 20, 1958

Executive Board meeting.
Chairmen of committees.
Meeting called to order by President Atkinson.
Invocation by G. Fred Hale.
Welcome Address by Ship's Captain, Hans Bordeux.
Response by Roy T. Bovard.
President's Address by John A. Atkinson.
Surgical Correction of Prognathism. Dr. James E. Skaggs, Louisville, Kentucky.
Observations on Facial Growth and Their Clinical Significance. Alton W. Moore, Seattle, Washington.
Ladies Auxiliary meeting.
The Role of Occlusal Dynamics in Orthodontic Treatment. William L. Wilson, Boston, Massachusetts.

Tuesday, Oct. 21, 1958

Individual clinics by guest speakers.

Wednesday, Oct. 22, 1958

Individual clinics by Society members.

Thursday, Oct. 23, 1958

Executive Board meeting.
Committee meetings.
Forum: Dr. Prescott Smith, moderator. (Dr. Smith summarized previous lectures; then a question-and-answer period followed. The panel consisted of James E. Skaggs, William L. Wilson, and Alton Moore.)
Business session with usual report of officers and committee chairmen, etc. Election of officers and selection of meeting place.

Friday, Oct. 24, 1958

Because of a storm, we were delayed a day in departure. Dr. Wilson gave another clinic, and some individual clinics by members were given.

Business session—unfinished business, installation of officers, presentation of past-president's key to John A. Atkinson.
Adjournment.

A storm delayed our departure from Bermuda, so there was some time for interesting shopping and sight-seeing on the island. The last day of the voyage home was very comfortable—the sea was calm and the weather was balmy.

The next meeting of the Southern Society will be in Atlanta, Georgia, and all members of the A. A. O. are cordially invited to meet with us.

The following officers were elected:

President, H. Harvey Payne, Atlanta, Georgia.
President-Elect, M. D. Edwards, Montgomery, Alabama.
Vice-President, Herbert D. Jaynes, Atlanta, Georgia.
Secretary-Treasurer, William H. Oliver, Nashville, Tennessee.
Junior Member of Board of Directors, Hal K. Terry, Miami, Florida.

Delegate to A. A. O., Boyd Tarpley, Birmingham, Alabama.
Alternate Delegate to A. A. O., E. D. Baker, Raleigh, North Carolina.
Associate Editor, G. Fred Hale, Raleigh, North Carolina.

Orthodontic Training of Members of the American Association of Orthodontists and of the Southern Society of Orthodontists by Year of Acceptance

1958—Preceptorship

Willis R. Brown—with Dr. J. E. Brown, Jr., plus Dr. O. A. Oliver's course in labio-lingual and Dr. Johnson's course in twin arch.
William O. Wimmer—with Dr. George W. Moss.

1958—University-Trained

Leonard Frantz—University of Illinois (two-year course).
William C. French—University of Michigan (twenty-one month course).
John A. Green—University of Southern California (two-year course).
Albert E. Miller—University of North Carolina (sixteen-month course).
James E. Phipps—Ohio State (eighteen-month course).
Theodore Segal—Tufts University (sixteen-month course).
John Charles Stanton—University of Pennsylvania (six-month course) plus associateship with Dr. D. Morrison, Sr.
Horace D. Wilder—Ohio State (eighteen-month course).

1957—Preceptorship

Paul Dimenstein—with Dr. Mayer Hoffman (five years) plus short courses with Drs. Lewis, Johnson, and Gore.
Donald Morrison, Jr.—with Dr. Donald Morrison, Sr.
Joseph A. Wells—with Dr. C. O. Wells, Sr. plus short courses with Drs. Oliver and Johnson at Washington University.

1957—University-Trained (Accepted at Miami Beach)

Bruce W. Higley—Iowa State (fifteen-month course).
Alan Jackson—Tufts University (eighteen-month course).
William G. Martin—Columbia University (sixteen-month course).
Fernando E. Rodriguez—Indiana University (twenty-four-month course).
Richard Starr—Indiana University (twenty-four-month course).
Jacob F. Straight—University of Illinois (one year).
William H. Walker—University of Tennessee (eighteen-month course).
Thomas M. Wilson—University of North Carolina (sixteen-month course).
Robert O. Zanone—University of Pennsylvania (sixteen-month course).

1957—University-Trained (Accepted at New Orleans)

Jerry W. Blackmer—University of Kansas City (fourteen-month course plus one year graduate work).
H. E. Burnham, Jr.—Dewey plus four months with Drs. Tarpley, Oliver, and Bowyer.
Worth M. Byrd—University of North Carolina (sixteen-month course).
Ralph E. Congleton—Ohio State (eighteen-month course).
Harry C. Good, Jr.—Northwestern University (sixteen-month course).
Walter Jared Hills III—University of Tennessee (eighteen-month course).
Neil J. Leonard, Jr.—University of Tennessee (eighteen-month course).
Shelley H. Phillips, Jr.—University of Montreal (sixteen-month course).
John J. Richardson—Columbia University (sixteen-month course).
Neal M. Roth—Columbia University (seventeen-month course).
John T. Schwartzbek—University of Michigan (two-year course).
Joseph A. Walker—University of Tennessee (eighteen-month course).

1956—Preceptorship

William M. Selden—with Drs. Joseph L. Selden and John A. Atkinson.
Clyde O. Wells, Jr.—with Dr. C. O. Wells (three years).

1956—University-Trained

Jerold F. Ahlfs—Graduate School at University of Minnesota (twenty-seven months).
Karol I. Andreve—Graduate School, University of Pennsylvania (twelve-month course).
Hernando de Castro—University of Michigan (one and one-half-year course).
Marion F. Dick—Northwestern University (sixteen-month course).
William P. G. Dodson—University of Pennsylvania (sixteen-month course).
Samuel Davis Gore, Jr.—University of Michigan (twenty-one-month course).
James B. McCabe—University of Alabama (three-year course).
Joseph Stephen Meadows—Emory University (twenty-four-month course).
Kenneth K. Shephard—Graduate School, University of Pittsburgh (one year).
Robert F. Taylor—University of Washington (Seattle) (fifteen-month course).

1955—Preceptorship

None.

1955—University-Trained

Philip J. Bright—Northwestern University (fifteen-month course).
W. Burnie Bunch—Northwestern University (two-year course).
H. V. Davenport—University of Pennsylvania (thirteen-month course).
William M. Ditto—University of Michigan (twenty-one-month course).
Thorwald Eros, Jr.—University of Southern California (sixteen-month course).
John M. Faust—University of Tennessee (six quarters).
Robert John Henns—Graduate School, Northwestern University (sixteen-month course).
Charles H. Hopkins—Ohio State (eighteen-month course).
Joseph Lawson Johnson—Emory University and Columbia University (short courses, two weeks each, in 1936, 1938, and 1940).
Vernon C. Maggard—Ohio State (eighteen-month course).
Andrew N. Mooney—University of Montreal (eleven-month course).
Eston E. Mullinix—Ohio State (twenty-two-month course).
Rubin Ruskin—Northwestern University (sixteen-month course).
Thomas C. Stults—Emory University (twenty-four-month course).
A. Raymond Tannenbaum—Columbia University (sixteen-month course).
Wendall H. Taylor—Emory University (twenty-four-month course).
Fernand J. Tiblier—University of Tennessee (twenty-month course).
Pendleton J. Thomas—Dewey (eight weeks).
Lyman E. Wagers—Ohio State (eighteen-month course).
Robert B. White—University of Tennessee (six quarters).
Hugh O. Wrenn—Columbia University (fifteen-month course).

1954—Preceptorship

None.

1954—University-Trained

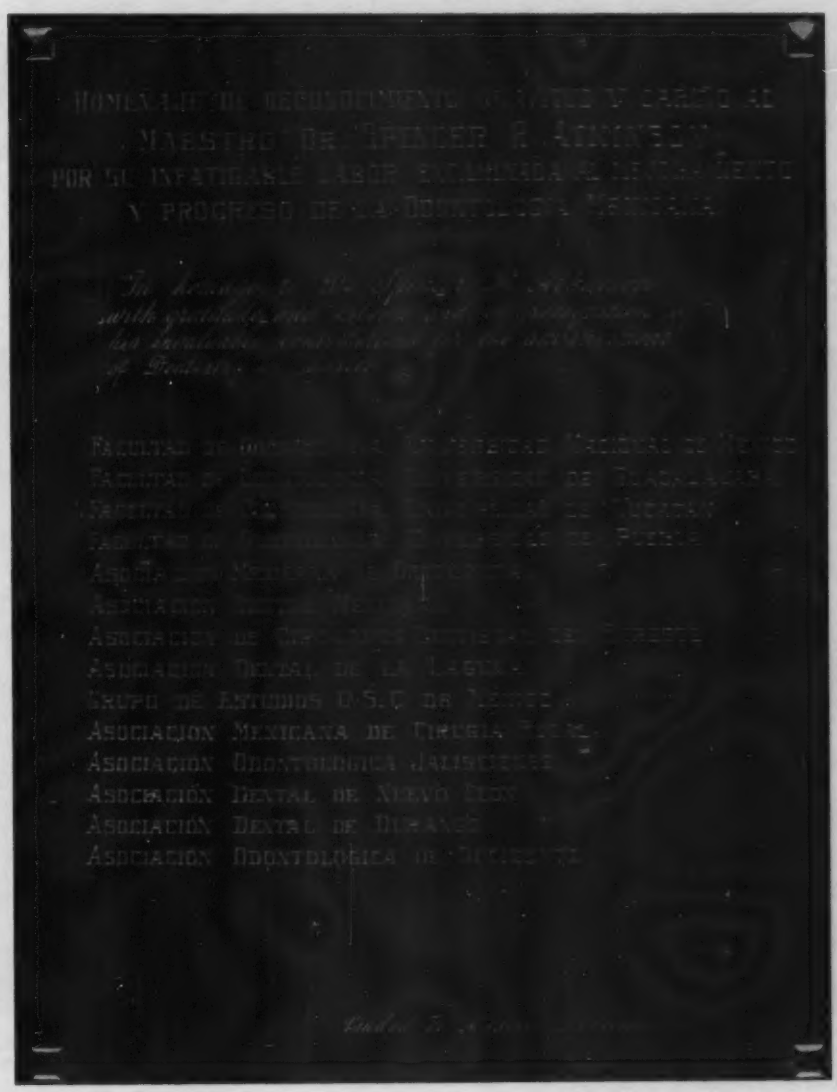
Lafayette Barrett—Tufts (fifteen-month course).
Louis L. Brown—Dewey (four-month course).
Murray A. Decoteau—University of Pennsylvania (thirteen-month course).
Irving J. Fleet—Northwestern University (fifteen-month course).
H. A. Hannett—Universite de Montreal (twelve-month course).
George W. Moss—University of Tennessee (eighteen-month course).
Robert M. Nelson—University of Iowa (sixteen-month course).
F. Robert Rampton—State University of Iowa (fifteen-month course).
Walter C. Sandusky, Jr.—University of Tennessee (two-year course).
Robert B. Smythe—Northwestern University (eighteen-month course).
Richard A. Walle—Loyola University (New Orleans) (three years).
William E. Wynens—Tufts (twelve-month course).

Pan-American Dental Congress

At the recent Pan-American Dental Congress in Mexico City, a panel discussion was held on five subjects pertaining to orthodontics:

1. Is there a relation between endocrine disturbance and malocclusion?
2. Is there convenience in starting treatment in the mixed dentition?
3. Which are the pros and contras of extraction in orthodontics?
4. How do you obtain in Europe the cooperation of the patient in using plates in orthopedics?
5. Does the bite plate produce disorders in the temporomandibular joint?

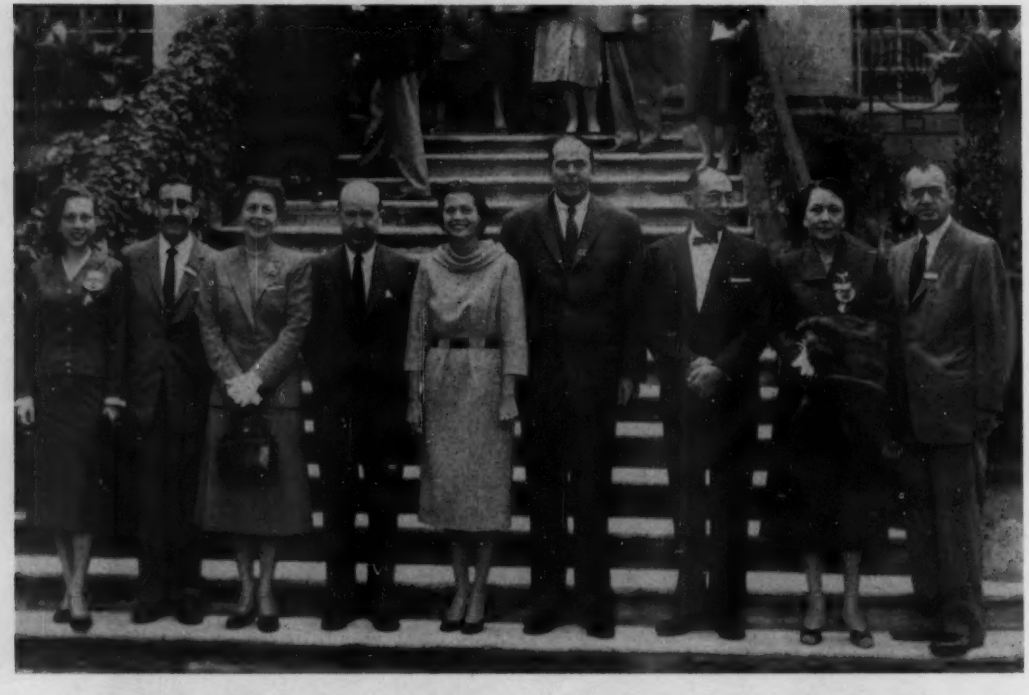
The members who took part were George M. Anderson, Spencer R. Atkinson, Gustav Korkhaus, C. Edward Martinek, Ernesto Poussin, Sidney Riesner, and Charles H. Tweed. Dr. Samuel Fastlicht acted as coordinator and Dra. Alicia Lazo de la Vega served as secretary.



The above is a photograph of the engraved plate given to Dr. Spencer R. Atkinson of Pasadena, California, as homage from the Mexican dental profesion and as initiative from the Mexican Association of Orthodontists. It reveals gratitude and esteem in recognition of valuable contributions to the advancement of dentistry in Mexico.

Participants in the panel discussion which was a feature of the recent Pan-American Dental Congress held in Mexico City.

Left to right: Charles H. Tweed (United States); George M. Anderson (United States); Ernesto Poussin (Cuba); C. Edward Martinek (United States); Samuel Fastlicht (Mexico), coordinator; Alicia Lazo de la Vega (Mexico), secretary; Sidney Riesner (United States); and Gustav Korkhaus (Germany). Spencer Atkinson, of the United States, was also a participant, but he does not appear in the photograph.



Pan-American Dental Congress. *Left to right:* Mrs. Roberto Ruff; Dr. Ruff, orthodontist and the president of the Mexican Dental Association; Mrs. George M. Anderson; Dr. Anderson, president-elect of the American Association of Orthodontists; Mrs. Robert C. Hill; Ambassador Robert C. Hill (U. S. ambassador to Mexico); C. Edward Martinek, president of the American Association of Orthodontists; Mrs. Martinek; Samuel Fastlicht, president of the Mexican Orthodontic Society.

On Nov. 19, 1958, Ambassador and Mrs. Hill gave a breakfast for members of the American Dental Association attending the Congress.

On this occasion Dr. Spencer R. Atkinson was honored for his twenty years of contribution to Mexican dentistry and particularly to orthodontics. At the inauguration session attended by the President of the Mexican Republic and the American Ambassador Mr. R. Hill, the director of the University delivered to Dr. Atkinson a diploma appointing him as extraordinary professor of orthodontics of the National University of Mexico. A silver engraved plate, with the following inscription, was presented to Dr. Atkinson:

> In homage to Dr. Spencer R. Atkinson with gratitude and esteem and in recognition of his invaluable contributions for the advancement of Dentistry in Mexico.

Orthodontic Section of The Canadian Dental Association

The following new officers were recently elected by the Orthodontic Section of the Canadian Dental Association:

Chairman, Walter Swiston, Montreal, Quebec.
Vice-Chairman, Joe J. Schachter, Saskatoon, Saskatchewan.
Secretary-Treasurer, Edward E. Johns, Kingston, Ontario.

Harold Chapman Retires From Practice

Harold Chapman has retired from the active practice of orthodontics, and his new address is Earl Hotel, Beaconsfield, Bucks, England. On Dec. 1, 1958, Dr. Chapman and Miss Bradley were married.

University of Michigan

The annual alumni reunion of graduates of the University of Michigan Orthodontic Department was held Feb. 2 and 3, 1959. The establishment of an orthodontic course leading to a master's degree began in this department in 1923. The first master's degrees in orthodontics at the University of Michigan were given to Drs. George R. Moore and Frank Cartwright in 1924. Therefore, this reunion marked the thirty-fifth anniversary of the establishment of the graduate course in orthodontics at Michigan.

Notes of Interest

Frederick R. Aldrich, D.M.D., and John E. Aldrich, D.D.S., announce their change of address to 17 North Harding Rd., Columbus, Ohio, practice limited to orthodontics.

Clarence E. Calcote announces the opening of his office for the practice of orthodontics at 159 Wentworth St., Charleston, South Carolina.

Bernard G. deVries, D.D.S., announces that Arthur D. Cumming, D.D.S., is now associated with him in the practice of orthodontics at 705 Medical Arts Bldg., Minneapolis, Minn.

Eston E. Mullinix, D.M.D., announces the removal of his office to 1500 South Olive Ave., West Palm Beach, Florida, practice limited to orthodontics.

Forthcoming meetings of the American Association of Orthodontists:
1959—Statler Hotel, Detroit, Michigan, May 4 to 7.
1960—Shoreham Hotel, Washington, D. C., April 24 to 28.
1961—Denver, Colorado.
1962—Los Angeles, California.

OFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and its component societies. The Editorial Board of the JOURNAL is composed of a representative of each of the component societies.

American Association of Orthodontists

(Next meeting May 4-7, 1959, Detroit)

President, C. Edward Martinek - - - - - - - - - - - Fisher Bldg., Detroit, Mich.
President-Elect, George M. Anderson - - - - - - - 3700 N. Charles St., Baltimore, Md.
Vice-President, Ernest N. Bach - - - - - - - - - - Professional Bldg., Toledo, Ohio
Secretary, Earl E. Shepard - - - - - - - - - - - - 8230 Forsyth, St. Louis, Mo.

Central Section of the American Association of Orthodontists

(Next meeting Sept. 28 and 29, 1959, Chicago)

President, John R. Thompson - - - - - - - - - - 55 E. Washington St., Chicago, Ill.
Secretary-Treasurer, William F. Ford - - - - - - - 575 Lincoln Ave., Winnetka, Ill.
Director, Elmer F. Bay - - - - - - - - - - - 216 Medical Arts Bldg., Omaha, Neb.

Great Lakes Society of Orthodontists

President, Edwin G. Flint - - - - - - - - - - 8047 Jenkins Arcade, Pittsburgh, Pa.
Treasurer, D. C. Miller - - - - - - - - - - - 40 South Third St., Columbus, Ohio
Director, Robert E. Wade - - - - - - - - - - - - 327 E. State St., Columbus, Ohio

Middle Atlantic Society of Orthodontists

(Next meeting Oct. 4-6, 1959, Washington)

President, Stephen C. Hopkins, Sr. - - - - - 1746 K St., N. W., Washington, D. C.
Secretary-Treasurer, Charles S. Jonas - - - - - - Mayfair Apts., Atlantic City, N. J.
Director, B. Edwin Erikson - - - - 3726 Connecticut Ave., N. W., Washington, D. C.

Northeastern Society of Orthodontists

(Next meeting March 9 and 10, 1959, New York)

President, Walter R. Bedell - - - - - - - - - 49 Market St., Poughkeepsie, N. Y.
Secretary-Treasurer, David Mossberg - - - - - - 36 Central Park S., New York, N. Y.
Director, Norman L. Hillyer - - - - - - - 230 Hilton Ave., Hempstead, L. I., N. Y.

Pacific Coast Society of Orthodontists

President, Richard Railsback - - - - - - - - - 1333 Grand Ave., Piedmont, Calif.
Secretary-Treasurer, Warren Kitchen - - - - - - 2037 Irving St., San Francisco, Calif.
Director, Richard Railsback - - - - - - - - - - 1333 Grand Ave., Piedmont, Calif.

Rocky Mountain Society of Orthodontists

(Next meeting Sept. 13-16, 1959, Aspen, Colo.)

President, Howard L. Wilson - - - - - - - - - 1107 Republic Bldg., Denver, Colo.
Secretary-Treasurer, E. H. Mullinax - - 209 Lakewood Medical Center, Lakewood, Colo.
Director, Ernest T. Klein - - - - - - - - - - - - Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

(Next meeting Oct. 11-14, 1959, Atlanta)

President, H. Harvey Payne - - - - - - - - - - 60 Fifth St., N.E., Atlanta, Ga.
Secretary-Treasurer, William H. Oliver - - - - - - - 1915 Broadway, Nashville, Tenn.
Director, Boyd W. Tarpley - - - - - - - 2118 Fourteenth Ave., S., Birmingham, Ala.

Southwestern Society of Orthodontists

(Next meeting Oct. 4-7, 1959, Houston)

President, Marcus Murphey - - - - - - - - - - 2017 West Gray, Houston, Texas
Secretary-Treasurer, Harold S. Born - - - - - - 908 S. Johnstone, Bartlesville, Okla.
Director, Nathan Gaston - - - - - - - - - - - - 701 Walnut St., Monroe, La.

American Board of Orthodontics

President, William R. Humphrey - - - - - - - - - 1232 Republic Bldg., Denver, Colo.
Vice-President, L. Bodine Higley - - - University of North Carolina, Chapel Hill, N. C.
Secretary, Wendell L. Wylie - - - - - - University of California School of Dentistry, The Medical Center, San Francisco, Calif.
Treasurer, Jacob A. Salzmann - - - - - - - - - 654 Madison Ave., New York, N. Y.
Director, B. F. Dewel - - - - - - - - - - - - - 708 Church St., Evanston, Ill.
Director, Frank P. Bowyer - - - - - - - - - 608 Medical Arts Bldg., Knoxville, Tenn.
Director, Paul V. Reid - - - - - - - - - 1501 Medical Arts Bldg., Philadelphia, Pa.

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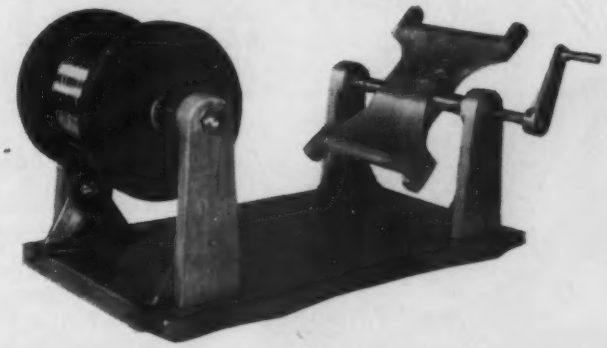

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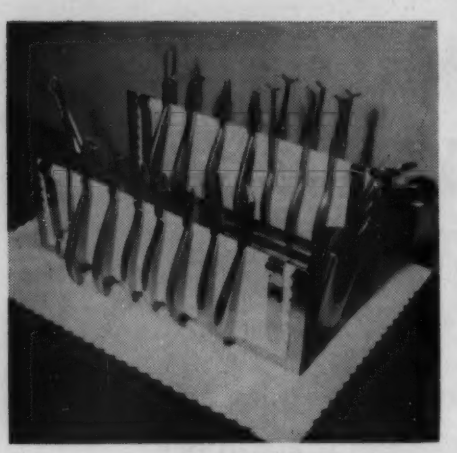

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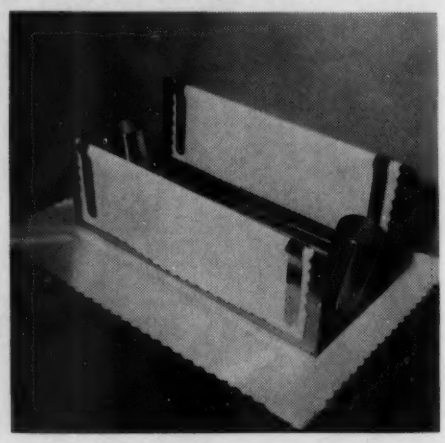

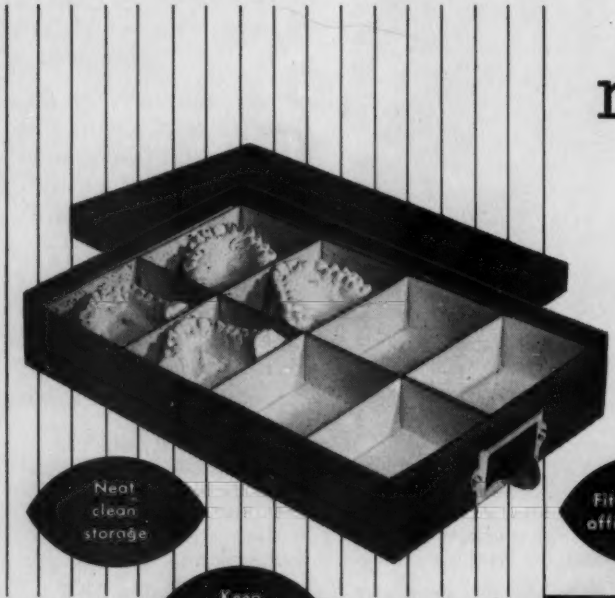

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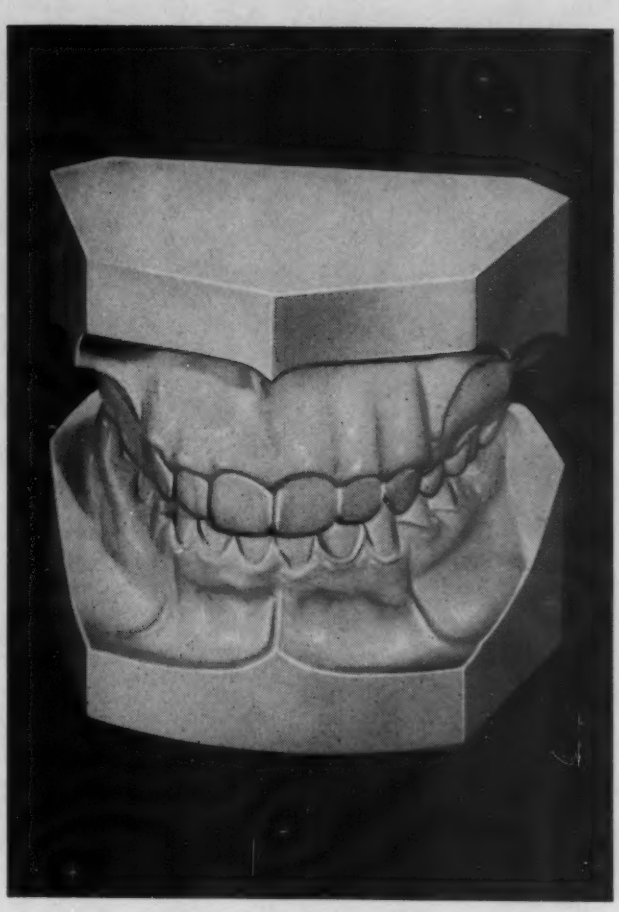

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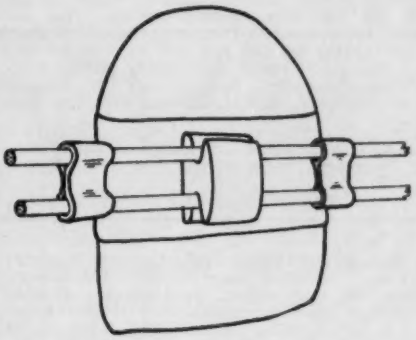

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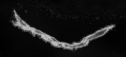

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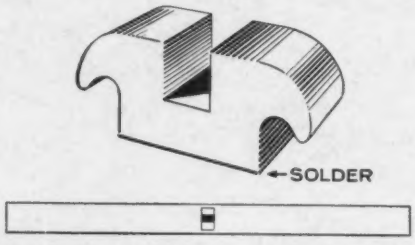

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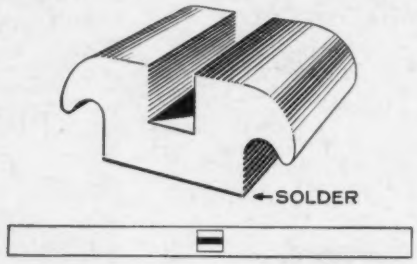

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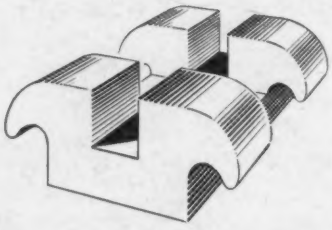

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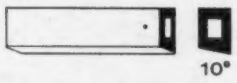

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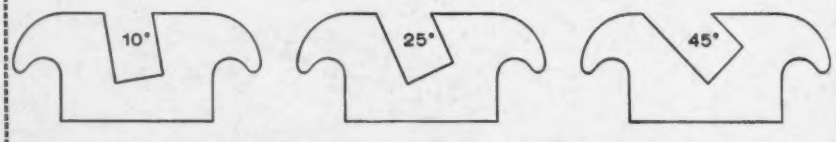

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